

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA25 | Castle Bromwich and Bromford

Data appendix (LQ-001-025)

Land quality

November 2013

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Department
for Transport

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Appendix LQ-001-025

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1 Introduction

- 1.1.1 The land quality appendix for the Castle Bromwich and Bromford community forum area (CFA) comprise:
- a summary of engagement undertaken (Section 2);
 - detailed risk assessment (Section 3);
 - inspection notes and other site data (Section 4);
 - geological sites of special scientific interest (SSSI) and local geological sites (LGS) (Section 5); and
 - mining and minerals data (Section 6).
- 1.1.2 Maps referred to throughout the land quality appendix are contained in the Volume 5 land quality map book.

2 Engagement

2.1.1 Table 1 sets out the local authorities and other organisations that have been engaged with during the preparation of the land quality section of the environmental impact assessment for the Castle Bromwich and Bromford study area, the types of information that have been provided to the assessment team and any specific concerns of those engaged with.

Table 1: Engagement on land quality issues undertaken for the study area

Local authority or other organisation	Method / dates of contact	Information provided and/or specific concerns
Birmingham City Council (BCC)	Contacted via e-mail / telephone / in person from July 2012 to August 2013	Contacted regarding collection and viewing of site investigation reports (including data recovery issues) from BCC's archive. Included the collection and return of a series of boxes of reports / files one at a time.
	Meeting on 28 November 2012	Meeting between the project team and BCC Environmental Protection Officer (EPO) – consultation regarding contaminated land designations. Minutes issued on 20 December 2012.
	Contacted via e-mail from December 2012 to January 2013	Consultation regarding confidential borehole logs held by British Geological Survey (BGS), unexploded ordnance (UXO) records and disused tanks (geographical information system (GIS) shapefiles). UXO data received. GIS shapefiles for disused tanks sent by BCC EPO on 28 January 2013.
	Contacted via e-mail during April 2013	Correspondence with BCC EPO regarding proposed meeting with the intention to discuss specific aspects of the Proposed Scheme and some of the key sites with which it will interact (relates to meeting of 9 May 2013).
	Meeting on 9 May 2013	Meeting between the project team and BCC EPO to discuss specific aspects of the scheme and some of the key sites it will interact with. Agreed to provide a request to BCC for any further specific site investigation reports required as a result of recent design alterations. BCC has subsequently provided any associated relevant information.
North Warwickshire Borough Council (NWBC)	Contacted via email during April 2013	Contact with Pollution Control Officer - NWBC regarding potentially contaminated land within the borough. Original email enquiry from the project team (Country North) was followed up as part of the study area is within NWBC's area. NWBC was asked if it had any further information in relation to four infilled pits highlighted from Country North's searches. The Pollution Control Officer - NWBC replied to state that, other than mentioned on their planning application search pages online that there was a historic permission for the use of the Hillcrest site as a tip (reference 10/7/59), they did not hold any further information. However, NWBC did note that two of the infilled ponds (western and southern) were definitely outside of their area.
Solihull Metropolitan Borough Council (SMBC) –	Contacted via email from 2012 to 2013	SMBC was originally contacted in August 2012 by the project team regarding information on contaminated land or potentially contaminated land sites within Solihull- including

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Local authority or other organisation	Method / dates of contact	Information provided and/or specific concerns
Environmental Health Department	Meeting 19 March 2013	<p>a request for a GIS layer of potentially contaminated sites within Solihull.</p> <p>A meeting was held on the 19 March 2013 between the project team and SMBC to discuss land quality issues including contaminated land, mining and mining reserves and land designations.</p> <p>A GIS layer containing potentially contaminated sites was received on 21 June 2013.</p>
SMBC – Spatial Planning Department	<p>Contacted via email from 2012 to 2013</p> <p>Meeting 27 March 2013</p>	<p>SMBC were contacted by the project team requesting information on mineral designations, mineral planning applications and landfill sites within Solihull. Responses were received via email in 2012 and 2013. Mineral designation shapefiles were received on 3 July 2013, but none were found to influence the study area.</p>
Environment Agency	Contacted via email / telephone during February 2013	<p>A request was made by email on 6 February 2013 for information held about Cow Lane lagoons. A phone call reply was received from the Environment Agency on 14 February 2012 to confirm that they had only had discussions on-site with Severn Trent Water (STW) regarding the lagoons and that they do not hold any reports or information on them.</p>
	Contacted via e-mail / telephone from March 2013 to May 2013	<p>A request for information on landfill sites and special / potentially contaminated sites within study area. This was followed up by a telephone call on 11 March 2013 from which it was confirmed that the request had been passed on to the Midlands customer service desk with a response due by 19 March. A request for a GIS file for the area was received on 15 March 2013 and the GIS file was sent on 18 March 2013. A reply was received on 16 May 2013, but attachments were missing; an email was sent on 20 May 2013 requesting the attachments which were received on the same day. A telephone request (12 March 2013) was also made for the Environment Agency to identify a person to meet with to discuss potential groundwater pollution issues on the route; this was followed up by e-mail on 18 March 2013 in the absence of a response.</p> <p>In mid May 2013, a collective approach was made to the Environment Agency requesting information regarding specific landfill sites and other sites of interest.</p> <p>A response was received on 7 August 2013 containing the available records.</p>
Severn Trent Water (STW)	Contacted via e-mail / telephone during February 2013	<p>E-mail sent to STW from the project team regarding information held about the Cow Lane lagoons on 14 February 2013; an email reply was received the same day providing the information STW have on the lagoons. A follow up telephone call was made on 15 February 2013 to confirm the basis for depths of lagoons detailed in the email.</p>
West Midlands Fire Service (WMFS)	Contacted via e-mail / telephone / in person from April 2013 to August 2013	<p>Enquiry regarding sites identified for possible bulk fuel storage and arrangement of specific site searches to be undertaken. Including a meeting between land quality and the WMFS to discuss required searches. It was highlighted during correspondence that normally, before beginning any</p>

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Local authority or other organisation	Method / dates of contact	Information provided and/or specific concerns
	(Meeting on 9 May 2013)	<p>environmental searches, the Petrol Licensing Authority require authorisation from the landowners to release any information and this was requested of the project team. During the meeting on the 9 May 2013, it was agreed that the project team prioritise the sites to those of particular interest. A reduced shortlist of 16 sites to be searched was provided. The results of the first search were sent on the 12 June 2013 to confirm it met with the project team's requirements; this was confirmed. Since then, the search results have continued to be received as and when they are completed; any associated search-specific queries have been clarified as and when the results are received. Searches were completed week ending 4 August 2013.</p>

3 Detailed risk assessment

- 3.1.1 This section presents assessments for the higher risk potentially contaminated sites within the study area. For each site the following data is presented:
- baseline risk assessment;
 - construction risk assessment;
 - post-construction risk assessment; and
 - assessment of temporary (construction) and permanent (post-construction) effects.
- 3.1.2 Grouping has been applied in accordance with the Scope and Methodology Report (SMR) Addendum in Appendix CT-001-000/2, in Volume 5.
- 3.1.3 The purpose of the grouping is to enable the assessment of a large number of sites within the study area that share similar characteristics. The grouping as part of the detailed assessment considers the type of contamination, for example soil/groundwater contamination with or without a potential for ground gas to also be present. It also seeks to differentiate between potentially contaminated sites that fall directly within the land required to construct the Proposed Scheme and those which fall outside.
- 3.1.4 The groups are defined as:
- conceptual site model (CSM) Group A: Sites* that fall fully/partially within the land required to construct the Proposed Scheme, potentially affected by soil/groundwater contamination and ground gas;
 - CSM Group B: Sites* that fall fully/partially within the land required to construct the Proposed Scheme, potentially affected by soil/groundwater contamination only;
 - CSM Group C: Sites* that fall outside of the land required to construct the Proposed Scheme, potentially affected by soil/groundwater contamination and ground gas; and
 - CSM Group D: Sites* that fall outside of the land required to construct the Proposed Scheme, potentially affected by soil/groundwater contamination only.
- *'Sites' are defined as the Stage C potentially contaminated sites that have been identified following the screening process in Stages A and B.¹
- 3.1.5 The assessment of grouped sites is considered to be a high level assessment that is designed to distinguish between the key interactions that the different groups of potentially contaminated sites would have with the construction and post-construction stages of the Proposed Scheme. For the purpose of the grouped assessments the term "on-site users" refers to users of the potentially contaminated sites identified.

¹ These stages are described in the assessment methodology, set out in the SMR (Volume 5: Appendix CT-001-000/1) and the SMR addendum (Volume 5: Appendix CT-001-000/2).

- 3.1.6 Selected more detailed site-specific assessment are presented for key areas where significant earthworks are planned in either (i) an area of potential contamination, or (ii) a particular sensitive environment. These assessments are more focused and consider both the interaction between potentially contaminated sites within the land required to construct the Proposed Scheme, as well as those outside of this (but within the study area). Potentially contaminated sites included that are outside of the area being assessed are generally sites which neighbour the land required to construct the Proposed Scheme. For the site specific assessment, the term "on-site users" refers to the current site users of the areas required for construction as opposed to users of the neighbouring sites assessed.
- 3.1.7 Contaminant types included within the risk assessments are based on the Department of the Environment, Farming and Rural Affairs (DEFRA) and Environment Agency (2002), *Potential Contaminants for the Assessment of Land* (CLR 8).² Although this report has been withdrawn by the Environment Agency, there has been no subsequent authoritative document to replace it and it is still commonly used and considered good practice.
- 3.1.8 The remainder of this section presents the risk assessment for the sites going through to Stage C and D of the assessment. These sites are shown on Maps LQ-01-066b, LQ-01-067 and LQ-01-068a, (Volume 5 Map Book Land Quality).
- 3.1.9 The following abbreviations are used in these tables:
- CSM - conceptual site model;
 - Draft CoCP - code of construction practice;
 - LNR - local nature reserve;
 - PAH - polycyclic aromatic hydrocarbons;
 - PCB - polychlorinated biphenyls;
 - PPE - personal protective equipment;
 - RAMSAR sites - wetlands of international importance, designated under the Ramsar Convention;³
 - SSSI - site of special scientific interest; and
 - VOC - volatile organic compound.
- 3.1.10 The assessment that follows has not assessed new or diverted utilities that will be located within the boundaries of existing highways. These are scoped out of the assessment as although there is work below ground, it is predominantly within highway construction i.e. non-contaminative materials. These are low risk with regard to land contamination issues, and therefore unlikely to cause any significant land quality effects.
- 3.1.11 The land required to construct the Proposed Scheme between the A47 Fort Parkway and Chester Road has been scoped out of the assessment as this is assigned exclusively for utility diversions within existing highways.

² DEFRA and Environment Agency, (2002), *Potential Contaminants for the Assessment of Land* (CLR 8).

³ Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.

Detailed risk assessment - Group A

Table 2: Detailed risk assessment for Group A sites in the study area

Site ID (IDS)	6, 14, 16, 92, 130, 134 and 135
Community forum area	Castle Bromwich and Bromford
Site group	Group A: sites fully / partially within the land required to construct the Proposed Scheme, potentially affected by soil/groundwater contamination and ground gas
Site title (Site ID) and land use class⁴	<p>Castle Bromwich Waste Treatment Site former landfill, currently Tameside Drive Civic Amenity Site and Castle Bromwich Incinerator Bottom Ash Processing Facility (6), class 3 historical land use</p> <p>British Car Auctions / former Tameside Drive - Langley Drive Landfill Site (14), class 3 current & historical land use</p> <p>Former Tameside Drive - Langley Drive Landfill Site (16), class 3 historical land use</p> <p>Infilled land (92), class 2 historical land use</p> <p>Infilled pond (130), class 2 historical land use</p> <p>Worked / infilled land (134), class 2 historical land use</p> <p>Worked / infilled land (135), class 2 historical land use</p>
Receptors	
Sensitive land use e.g. housing, schools, parks, playgrounds (adjacent and/or <50m)	None
Aquifer e.g. Secondary A or Principal	<p>Superficial: Secondary A (Alluvium / River Terrace Deposits)</p> <p>Bedrock: Secondary B (Mercia Mudstone)</p>
Surface watercourses (adjacent and/or <50 m)	River Tame, ponds in Park Hall nature reserve
Geological or ecological designations e.g. SSSI or RAMSAR	Park Hall nature reserve
Property e.g. mineral resources, buildings and structures, Grade 1 agricultural land	No significant mineral resources. Commercial buildings and infrastructure present throughout. Buildings and structures (potentially affected by ground gas).
Post-construction development	
<p>6 and 14 – eastern tunnel portal and approach in retained cut. Level at portal approximately 14m below existing ground level.</p> <p>16 – Associated construction on land required to construct the Proposed Scheme.</p>	

⁴ As defined by Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2)

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Table 3: Baseline CSM and qualitative risk assessment for Group A sites

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination Ground gas Potential for a range of inorganic and organic contaminants including but not limited to: Heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, PAH, solvents, lubricants, fuel oils, alkalis, PCB, methane and carbon dioxide.	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Medium	Moderate/low risk
	Off-site users - commercial, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Medium	Low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination Ground gas	Controlled waters – surface waters (River Tame)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
Potential for a range of inorganic and organic contaminants including but not limited to: heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, PAH, solvents, lubricants, fuel oils, alkalis, PCB, methane and carbon dioxide.	Property receptors – buildings, foundations, and services (on-site and off-site)	Exposure to explosive gases	Low	Medium	Moderate/low risk
	Ecological/geological designations	Vertical and lateral migration, direct contact	Low	Medium	Moderate/low risk
Notes / assumptions Sites assessed without construction of the Proposed Scheme.					

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Table 4: Construction CSM and qualitative risk assessment for Group A sites

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>Heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, PAH, solvents, lubricants, fuel oils, alkalis, PCB, methane and carbon dioxide.</p>	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users - commercial, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Medium to severe	Low risk to moderate/low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium to severe	Moderate/low risk to moderate risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination Ground gas Potential for a range of inorganic and organic contaminants including but not limited to: Heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, PAH, solvents, lubricants, fuel oils, alkalis, PCB, methane and carbon dioxide.	Controlled waters – surface waters (River Tame)	Groundwater migration, direct run-off from site	Low	Medium to severe	Moderate/low risk to moderate risk
	Property receptors – buildings, foundations, and services (on-site and off-site)	Exposure to explosive gases	Low	Medium to severe	Moderate/low risk to moderate risk
	Ecological / geological designations	Vertical and lateral migration, direct contact	Low	Medium to severe	Moderate/low risk to moderate risk
Notes / assumptions During construction standard mitigation procedures are assumed to be implemented in accordance with the CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management. N/A is not applicable, as on-site users have been removed from the construction stage CSM as they will not be present during construction. Whilst the CoCP will make it unlikely that there will be adverse consequences associated with construction e.g. the control of surface run-off and dust, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area. Ground investigation will be required prior to construction. Assumes construction phase includes remediation that may be required.					

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Table 5: Post-construction CSM and qualitative risk assessment for Group A sites

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Negligible to medium	Very low risk to low risk
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Negligible to medium	Very low risk to low risk
		Inhalation of ground gases	Unlikely	Negligible to medium	Very low risk to low risk
	Off-site users – commercial, LNR	Direct contact, ingestion, inhalation of dusts and vapours from contaminated soils	Unlikely	Negligible to minor	Very low risk
		Direct contact, ingestion, inhalation of vapours from contaminated waters	Unlikely	Negligible to minor	Very low risk
		Inhalation of ground gases	Unlikely	Negligible to medium	Very low risk to low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Unlikely	Negligible to medium	Very low risk to low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	Controlled waters – surface waters (River Tame)	Groundwater migration, direct run-off from site	Unlikely	Negligible to medium	Very low risk to low risk
	Property receptors – buildings, foundations, and services (on-site and off-site)	Exposure to explosive gases	Unlikely	Negligible to medium	Very low risk to low risk
	Ecological / geological designations	Vertical and lateral migration, direct contact	Unlikely	Negligible to medium	Very low risk to low risk
<p>Notes / assumptions</p> <p>Assumes remediation required has been undertaken and construction works are complete.</p> <p>'On-site users' excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.</p> <p>A range may be given as remediation strategies will vary in design to focus on specific contaminative risks at each site. Remediation strategies may involve source removal or pathway intervention as appropriate.</p>					

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Table 6: Significance of impact during construction and post-construction for Group A sites

Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – on-site users (commercial)	Low risk	N/A	Very low risk to low risk	N/A	Negligible to minor beneficial
Exposure to groundwater contamination – on-site users (commercial)	Low risk	N/A	Very low risk to low risk	N/A	Negligible to minor beneficial
Exposure to ground gas – on-site users (commercial)	Moderate/low risk	N/A	Very low risk to low risk	N/A	Minor beneficial to moderate beneficial
Exposure to soil contamination – off-site users (commercial, LNR)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (commercial, LNR)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to ground gas – off-site users (commercial)	Low risk	Low risk to moderate/low risk	Very low risk to low risk	Negligible to minor adverse	Negligible to minor beneficial

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Contaminated soil, leachate/groundwater and pollution of aquifers	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Contaminated soil, leachate/groundwater and impact on surface watercourses	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Impact on property receptors	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Impact on ecological/geological designations	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Overall significance				Negligible to minor adverse	Negligible to moderate beneficial
Notes / assumptions Assumes that remediation has been undertaken and construction works complete. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.					

Detailed risk assessment – Group B

Table 7: Detailed risk assessment for Group B sites in the study area

Site ID (IDS)	8, 17, 18, 64, 78, 80, 82, 88, and 113
Community forum area	Castle Bromwich and Bromford
Site group	Group B: sites fully / partially within the land required to construct the Proposed Scheme, potentially affected by soil/groundwater contamination only
Site title (Site ID) and land use class⁵	<p>Hayward Industrial Estate/Castle Bromwich Business Park (8), class 2 current and historical land use</p> <p>Former abattoir (17 and 18), class 3 historical land use</p> <p>Paul Ponsonby (storage and distribution) (64), class 1 current land use</p> <p>Former railway station (78), class 2 historical land use</p> <p>Former sewage works (80), class 2 historical land use</p> <p>Former fertiliser works (82) class 3 historical land use</p> <p>Esso pipeline (88), class 2 current land use</p> <p>Railway land within CFA25 (113), class 2 current and historical land use</p>
Receptors	
Sensitive land use e.g. housing, schools, parks, playgrounds (adjacent and/or <50m)	Housing in Castle Vale and Ward End, playing field, play area, public open space, Park Hall nature reserve
Aquifer e.g. Secondary A or Principal	<p>Superficial: Secondary A (Alluvium / River Terrace Deposits)</p> <p>Bedrock: Secondary B (Mercia Mudstone)</p>
Surface watercourses (adjacent and / or <50 m)	River Tame, overflow channel, ponds
Geological or ecological designations e.g. SSSI or RAMSAR	Park Hall nature reserve
Property e.g. mineral resources, buildings and structures, Grade 1 agricultural land	No significant mineral resources. Residential and commercial buildings and infrastructure present throughout.
Post-construction development	
Associated construction within land required to construct the Proposed Scheme	

⁵ As defined by Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2)

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Table 8: Baseline CSM and qualitative risk assessment for Group B sites

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>Pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, solvents, herbicides, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, PAH, ammonium salts and phosphates.</p>	On-site users – current (playing field, residential, LNR)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	N/A	N/A	N/A
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – residential, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants, including but not limited to:</p> <p>pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, solvents, herbicides, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, PAH, ammonium salts and phosphates.</p>		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface waters (River Tame, overflow channel, ponds)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	N/A	N/A	N/A
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions Sites assessed without construction of the Proposed Scheme. N/A is not applicable, due to grouping assumption that Group B sites are not affected by ground gas.					

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Table 9: Construction CSM and qualitative risk assessment for Group B sites

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, solvents, herbicides, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, PAH, ammonium salts and phosphates.</p>	On-site users – current (playing field, residential, LNR)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – residential, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, solvents, herbicides, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, PAH, ammonium salts and phosphates.</p>		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium to severe	Moderate/low risk to moderate risk
	Controlled waters – surface waters (River Tame, overflow channel, ponds)	Groundwater migration, direct run-off from site	Low	Medium to severe	Moderate/low risk to moderate risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	N/A	N/A	N/A
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor to medium	Low risk to moderate/low risk
<p>Notes / assumptions</p> <p>During construction standard mitigation procedures are assumed to be implemented in accordance with the CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management.</p> <p>N/A is not applicable, as on-site users have been removed from the construction stage CSM as they will not be present during construction; or due to grouping assumption that Group B sites are not affected by ground gas.</p> <p>Whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the CoCP generally results in a low or unlikely probability, but in some cases the consequence may temporarily increase from that defined at baseline. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.</p> <p>Ground investigation will be required prior to construction.</p> <p>Assumes construction phase includes remediation that may be required.</p>					

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Table 10: Post-construction CSM and qualitative risk assessment for Group B sites

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate and groundwater contamination	On-site users – current (playing field, residential, LNR)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to medium	Very low risk to low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to medium	Very low risk to low risk
		Inhalation of ground gases	N/A	N/A	N/A
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to medium	Very low risk to low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to medium	Very low risk to low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – residential, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to medium	Very low risk to low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate and groundwater contamination		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to medium	Very low risk to low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users –commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to minor	Very low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Unlikely	Negligible to medium	Very low risk to low risk
	Controlled waters – surface waters (River Tame, overflow channel, ponds)	Groundwater migration, direct run-off from site	Unlikely	Negligible to medium	Very low risk to low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate and groundwater contamination	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	N/A	N/A	N/A
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Unlikely	Negligible to low	Very low risk
<p>Notes / assumptions</p> <p>Assumes remediation required has been undertaken and construction works are complete.</p> <p>N/A is not applicable, due to grouping assumption that Group B sites are not affected by ground gas.</p> <p>'On-site users' excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction.</p> <p>A range may be given as remediation strategies will vary in design to focus on specific contaminative risks at each site. Remediation strategies may involve source removal or pathway intervention as appropriate.</p>					

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Table 11: Significance of impact during construction and post-construction for Group B sites

Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – on-site users (playing field, residential, LNR)	Moderate/low risk	N/A	Very low risk to low risk	N/A	Minor beneficial to moderate beneficial
Exposure to groundwater contamination – on-site users (playing field, residential, LNR)	Moderate/low risk	N/A	Very low risk to low risk	N/A	Minor beneficial to moderate beneficial
Exposure to ground gas – on-site users (playing field, residential, LNR)	N/A	N/A	N/A	N/A	N/A
Exposure to soil contamination – on-site users (commercial)	Low risk	N/A	Very low risk to low risk	N/A	Negligible to minor beneficial
Exposure to groundwater contamination – on-site users (commercial)	Low risk	N/A	Very low risk to low risk	N/A	Negligible to minor beneficial
Exposure to ground gas – on-site users (commercial)	N/A	N/A	N/A	N/A	N/A

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – off-site users (residential, public open space, LNR)	Low risk	Low risk	Very low risk to low risk	Negligible	Negligible to minor beneficial
Exposure to groundwater contamination – off-site users (residential, public open space, LNR)	Low risk	Low risk	Very low risk to low risk	Negligible	Negligible to minor beneficial
Exposure to ground gas – off-site users (residential, public open space, LNR)	N/A	N/A	N/A	N/A	N/A
Exposure to soil contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to ground gas – off-site users (commercial)	N/A	N/A	N/A	N/A	N/A
Contaminated soil leachate/groundwater and pollution of aquifer	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Contaminated soil leachate/groundwater and impact on surface watercourse	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Impact on property receptors	N/A	N/A	N/A	N/A	N/A
Impact on ecological/geological designations	Low risk	Low risk to moderate/low risk	Very low risk	Negligible to minor adverse	Minor beneficial
Overall significance				Negligible to minor adverse	Negligible to moderate beneficial
Notes / assumptions Assumes that remediation has been undertaken and construction works complete. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.					

Detailed risk assessment – Group C

Table 12: Detailed risk assessment for Group C sites in the study area

Site ID (IDS)	11, 12, 13, 15, 86, 89*, 117, 119, 120, 125, 126 and 136
Community forum area	Castle Bromwich and Bromford
Site group	Group C: sites outside of the land required to construct the Proposed Scheme potentially affected by soil / groundwater contamination and ground gas
Site title (Site ID) and land use class⁶	<p>Former Tameside Drive - Langley Drive Landfill Site (11, 12, 13 and 15), class 3 historical land use</p> <p>Former Castle Vale Tip / former sewage works (86), class 3 historical land use</p> <p>Worked / infilled land (89*), class 3 historical land use</p> <p>Greenworks Training Academy / former pit (assumed to be infilled) (117), class 3 historical land use</p> <p>Unspecified yard/vehicle storage / former refuse heap (assumed infilled/levelled) (119), class 3 historical land use</p> <p>Various industrial units/uses / former refuse heap (assumed infilled/levelled) (120), class 3 historical land use</p> <p>UK Mail depot / former refuse heaps/gravel pits (assumed infilled/levelled); former landfill (125), class 3 historical land use</p> <p>Derelict land (former LDV site) / former refuse heaps/gravel pits (assumed infilled/levelled); historical 'land rear of freight rover works' landfill (126), class 3 historical land use</p> <p>Worked/infilled land (136), class 2 historical land use</p>
Receptors	
Sensitive land use e.g. housing, schools, parks, playgrounds (adjacent and/or <50m)	Housing in Ward End, schools (Park Hall Academy and Chivnor Primary), public open space, playing field, allotment gardens
Aquifer e.g. Secondary A or Principal	<p>Superficial: Secondary A (Alluvium / River Terrace Deposits)</p> <p>Bedrock: Secondary B (Mercia Mudstone)</p>
Surface watercourses (adjacent and/or <50 m)	River Tame and drain (126)
Geological or ecological designations e.g. SSSI or RAMSAR	Park Hall nature reserve
Property e.g. mineral resources, buildings and structures, Grade 1 agricultural land	No significant mineral resources. Commercial buildings and infrastructure present throughout. Buildings and structures (potentially affected by gas).
Post-construction development	
None. Sites are located outside of the land required to construct the Proposed Scheme.	

⁶ As defined by Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2)

Notes / assumptions

* Site has been included in this CSM group despite falling partially within the land required to construct the Proposed Scheme due to the limited extent to which it crossed into this area (<1% of the site area).

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Table 13: Baseline CSM and qualitative risk assessment for Group C sites

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>Heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, ammonium, sulphates, sulphides, cyanides, ammoniums, nitrates, phosphates, fuel oils, PCB, pathogens, methane and carbon dioxide.</p>	On-site users – current (allotment gardens, public open space)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	Low	Medium	Moderate/low risk
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Minor	Low risk
	Off-site users - residential, playing field, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, ammonium, sulphates, sulphides, cyanides, ammoniums, nitrates, phosphates, fuel oils, PCB, pathogens, methane and carbon dioxide.</p>		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Minor	Low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Low	Minor	Low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface water (River Tame)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Medium	Moderate/low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination Ground gas	Ecological / geological designations	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions Sites assessed without construction of the Proposed Scheme. 'On-site' and 'off-site' here refer to site users being situated within or adjacent to the potentially contaminated sites being assessed.					

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Table 14: Construction CSM and qualitative risk assessment for Group C sites

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination Ground gas Potential for a range of inorganic and organic contaminants including but not limited to: heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, ammonium, sulphates, sulphides, cyanides, ammoniums, nitrates, phosphates, fuel oils, PCB, pathogens, methane and carbon dioxide.	On-site users – current (allotment gardens, public open space)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	Low	Medium	Moderate/low risk
	On-site users – (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Minor to medium	Low risk to moderate/low risk
	Off-site users – residential, playing field, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, ammonium, sulphates, sulphides, cyanides, ammoniums, nitrates, phosphates, fuel oils, PCB, pathogens, methane and carbon dioxide.</p>		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Minor to medium	Low risk to moderate/low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Low	Minor to medium	Low risk to moderate/low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium to severe	Moderate/low risk to moderate risk
	Controlled waters – surface water (River Tame)	Groundwater migration, direct run-off from site	Low	Medium to severe	Moderate/low risk to moderate risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Medium to severe	Moderate/low risk to moderate risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination Ground gas	Ecological/geological designations	Vertical and lateral migration, direct contact	Low	Minor to medium	Low risk to moderate/low risk
<p>Notes / assumptions</p> <p>During construction standard mitigation procedures are assumed to be implemented in accordance with the CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management.</p> <p>'On-site' and 'off-site' here refer to site users being situated within or adjacent to the potentially contaminated sites being assessed.</p> <p>Whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.</p>					

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Table 15: Post-construction CSM and qualitative risk assessment for Group C sites

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	On-site users – current (allotment gardens, public open space)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	Low	Medium	Moderate/low risk
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Minor	Low risk
	Off-site users – residential, playing field, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Minor	Low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Low	Minor	Low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface water (River Tame)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Medium	Moderate/low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	Ecological/geological designations	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions 'On-site' and 'off-site' here refer to site users being situated within or adjacent to the potentially contaminated sites being assessed. Sites within this CSM group are located outside of the land required to construct the Proposed Scheme and represent off-site potential sources of contamination. Due to the absence of remediation targeting these sites, the source at post-construction will remain the same as at baseline.					

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Table 16: Significance of impact during construction and post-construction for Group C sites

Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – on-site users (allotment gardens, public open space)	Moderate/low risk	Moderate/low risk	Moderate/low risk	Negligible	Negligible
Exposure to groundwater contamination – on-site users (allotment gardens, public open space)	Moderate/low risk	Moderate/low risk	Moderate/low risk	Negligible	Negligible
Exposure to ground gas – on-site users (allotment gardens, public open space)	Moderate/low risk	Moderate/low risk	Moderate/low risk	Negligible	Negligible
Exposure to soil contamination – on-site users (commercial)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to groundwater contamination – on-site users (commercial)	Low risk	Low risk	Low risk	Negligible	Negligible

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to ground gas – on-site users (commercial)	Low risk	Low risk to moderate/low risk	Low risk	Negligible to minor adverse	Negligible
Exposure to soil contamination – off-site users (residential, playing field, public open space, LNR)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (residential, playing field, public open space, LNR)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to ground gas – off-site users (residential, playing field, public open space, LNR)	Low risk	Low risk to moderate/low risk	Low risk	Negligible to minor adverse	Negligible
Exposure to soil contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to ground gas – off-site users (commercial)	Low risk	Low risk to moderate/low risk	Low risk	Negligible to minor adverse	Negligible
Contaminated soil leachate/groundwater and pollution of aquifer	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Contaminated soil leachate/groundwater and impact on surface watercourse	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Impact on property receptors	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Impact on ecological/ geological designations	Low risk	Low risk to moderate/low risk	Low risk	Negligible to minor adverse	Negligible
Overall significance				Negligible to minor adverse	Negligible
Notes / assumptions					
A range is in places given as whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may be temporary minor adverse effects during the construction period from ground disturbance. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.					

Detailed risk assessment – Group D

Table 17: Detailed risk assessment for Group D sites in the study area

Site ID (IDS)	4, 5, 10, 23, 25, 62, 63, 67, 84, 87*, 114 and 122
Community forum area	Castle Bromwich and Bromford
Site group	Group D: sites outside of the land required to construct the Proposed Scheme potentially affected by soil/groundwater contamination only
Site title (Site ID) and land use class⁷	Former aerodrome (4, 5, 84 and 87*), class 3 historical land use Dura Automotive Body and Glass Systems Ltd (10), class 2 current land use Fort Industrial Park (23), class 2 current and historical land use Jaguar facility (25), class 3 current land use Former tanks present / former tube works (62) class 3 historical land use Former tube works (63) class 2 historical land use National Grid storage yard (67), class 3 current land use Railway land within CFA26 (114), class 2 current and historical land use Various small industrial/commercial units including Ash Heat Treatments Ltd / former light engineering works (122), class 2 current and historical land use
Receptors	
Sensitive land use e.g. housing, schools, parks, playgrounds (adjacent and/or <50m)	Housing within Castle Vale and Ward End, schools (Castle Vale, Pegasus Primary, Chivenor Primary and Park Hall), play areas, playing field, stadium, Park Hall nature reserve, public open space
Aquifer e.g. Secondary A or Principal	Superficial: Secondary A (Alluvium / River Terrace Deposits) Bedrock: Secondary B (Mercia Mudstone)
Surface watercourses (adjacent and/or <50 m)	River Tame, Plants Brook, drain/overflow channel
Geological or ecological designations e.g. SSSI or RAMSAR	Park Hall nature reserve
Property e.g. mineral resources, buildings and structures, Grade 1 agricultural land	No significant mineral resources. Residential and commercial buildings and infrastructure present throughout.
Post-construction development	
None. Sites are located outside of the land required to construct the Proposed Scheme.	

⁷ As defined by Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2)

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Table 18: Baseline CSM and qualitative risk assessment for Group D sites

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination Potential for a range of inorganic and organic contaminants including but not limited to: pathogens, solvents, acids and alkalis, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, herbicides, paints and associated solvents and thinners, rust removers, corrosion inhibitors, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, phosphates, ammonium, PAH, methane and carbon dioxide.	On-site users – current (playing field, public open space)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	N/A	N/A	N/A
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – residential, school, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>pathogens, solvents, acids and alkalis, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, herbicides, paints and associated solvents and thinners, rust removers, corrosion inhibitors, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, phosphates, ammonium, PAH, methane and carbon dioxide.</p>		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface water (River Tame, Plants Brook, drain/overflow channel)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	N/A	N/A	N/A
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions Sites assessed without construction of the Proposed Scheme. N/A is not applicable, due to grouping assumption that Group D sites are not affected by ground gas. 'On-site' and 'off-site' here refer to site users being situated within or adjacent to the potentially contaminated sites being assessed.					

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Table 19: Construction CSM and qualitative risk assessment for Group D sites

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>pathogens, solvents, acids and alkalis, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, herbicides, paints and associated solvents and thinners, rust removers, corrosion inhibitors, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, phosphates, ammonium, PAH, methane and carbon dioxide.</p>	On-site users – current (playing field, public open space)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	N/A	N/A	N/A
	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – residential, school, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>pathogens, solvents, acids and alkalis, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, herbicides, paints and associated solvents and thinners, rust removers, corrosion inhibitors, PCB, asbestos, heavy metals, sulphates, nitrates, cyanides, phosphates, ammonium, PAH, methane and carbon dioxide.</p>		Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users - commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium to severe	Moderate/low risk to moderate risk
	Controlled waters – surface water (River Tame, Plants Brook, drain/overflow channel)	Groundwater migration, direct run-off from site	Low	Medium to severe	Moderate/low risk to moderate risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	N/A	N/A	N/A

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor to medium	Low risk to moderate/low risk
<p>Notes / assumptions</p> <p>During construction standard mitigation procedures are assumed to be implemented in accordance with the CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management.</p> <p>N/A is not applicable, due to grouping assumption that Group D sites are not affected by ground gas.</p> <p>'On-site' and 'off-site' here refer to site users being situated within or adjacent to the potentially contaminated sites being assessed.</p> <p>Whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.</p>					

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Table 20: Post-construction CSM and qualitative risk assessment for Group D sites

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate and groundwater contamination	On-site users - current (playing field, public open space)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Medium	Moderate/low risk
		Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Low	Medium	Moderate/low risk
		Inhalation of ground gases	N/A	N/A	N/A
	On-site users - current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users - residential, school, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate and groundwater contamination		Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users - commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
	Off-site users - commercial	Direct contact, ingestion, inhalation of dusts with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	N/A	N/A	N/A
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface water (River Tame, Plants Brook, drain/overflow channel)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	N/A	N/A	N/A

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate and groundwater contamination	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions 'On-site' and 'off-site' here refer to site users being situated within or adjacent to the potentially contaminated sites being assessed. N/A is not applicable, due to grouping assumption that Group D sites are not affected by ground gas. Sites within this CSM group are located outside of the land required to construct the Proposed Scheme and represent off-site potential sources of contamination. Due to the absence of remediation targeting these sites, the source at post-construction will remain the same as at baseline.					

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Table 21: Significance of impact during construction and post-construction for Group D sites

Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – on-site users (playing field, public open space)	Moderate/low risk	Moderate/low risk	Moderate/low risk	Negligible	Negligible
Exposure to groundwater contamination – on-site users (playing field, public open space)	Moderate/low risk	Moderate/low risk	Moderate/low risk	Negligible	Negligible
Exposure to ground gas – on-site users (playing field, public open space)	N/A	N/A	N/A	N/A	N/A
Exposure to soil contamination – on-site users (commercial)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to groundwater contamination – on-site users (commercial)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to ground gas – on-site users (commercial)	N/A	N/A	N/A	N/A	N/A

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – off-site users (residential, school, public open space, LNR)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (residential, school, public open space, LNR)	Low risk	Low risk	Low risk	Negligible	Negligible
Exposure to ground gas – off-site users (residential, school, public open space, LNR)	N/A	N/A	N/A	N/A	N/A
Exposure to soil contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to ground gas – off-site users (commercial)	N/A	N/A	N/A	N/A	N/A

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Contaminated soil leachate/groundwater and pollution of aquifer	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Contaminated soil leachate/groundwater and impact on surface watercourse	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Impact on property receptors	N/A	N/A	N/A	N/A	N/A
Impact on ecological/ geological designations	Low risk	Low risk to moderate/low risk	Low risk	Negligible to minor adverse	Negligible
Overall significance				Negligible to minor adverse	Negligible
Notes / assumptions					
A range is in places given as whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may be temporary minor adverse effects during the construction period from ground disturbance. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.					

Detailed risk assessment - River Tame realignment and replacement floodplain storage area in Park Hall nature reserve

Table 22: Detailed risk assessment for the River Tame realignment and replacement floodstorage area in Park Hall nature reserve

Site ID (IDS)	88, 92, 134 and 135 (within construction boundary) 4, 6, 80, 82, 86, 130 and 136 (outside of construction boundary)
Community forum area	Castle Bromwich and Bromford
Site group	Site/area specific : River Tame realignment and replacement floodplain storage area in Park Hall nature reserve – sites which fall fully / partially along the route of the River Tame realignment and replacement floodplain storage area, and sites which may influence this construction
Site title (Site ID) and land use class⁸	Within construction boundary: Esso pipeline (88), class 2 current land use Infilled land (92), class 2 historical land use Worked / infilled land (134), class 2 historical land use Worked / infilled land (135), class 2 historical land use Worked / infilled land (136), class 2 historical land use Outside of construction boundary: Former aerodrome (4) class 3 historical land use Castle Bromwich Waste Treatment Site former landfill, currently Tameside Drive Civic Amenity Site and Castle Bromwich Incinerator Bottom Ash Processing Facility (6), class 3 historical land use Former sewage works (80), class 2 historical land use Former fertiliser works (82) class 3 historical land use Former Castle Vale Tip / former sewage works (86), class 3 historical land use Infilled pond (130), class 2 historical land use
Receptors	
Sensitive land use e.g. housing, schools, parks, playgrounds (adjacent and/or <50m)	Housing in Castle Vale, Park Hall Academy, playing fields, stadium, play area, allotment gardens, Park Hall nature reserve
Aquifer e.g. Secondary A or Principal	Superficial: Secondary A (Alluvium / River Terrace Deposits) Bedrock: Secondary B (Mercia Mudstone)
Surface watercourses (adjacent and/or <50 m)	River Tame, Plants Brook, overflow channel, ponds
Geological or ecological designations e.g. SSSI or RAMSAR	Park Hall nature reserve

⁸ As defined by Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2)

Property e.g. mineral resources, buildings and structures, grade 1 agricultural land	No significant mineral resources. Residential and commercial buildings and infrastructure present throughout. Buildings and structures (potentially affected by gas)
Post-construction development	
River Tame realignment and replacement floodplain storage area	

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Table 23: Baseline CSM and qualitative risk assessment for the River Tame realignment and replacement floodplain storage area in Park Hall nature reserve

Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination	On-site users – current (LNR)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Minor	Low risk
Ground gas					
Potential for a range of inorganic and organic contaminants including, but not limited to: pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, heavy metals, ammonia, sulphates, organics, asbestos, nitro compounds, amines, PCB, phosphates, methane and carbon dioxide.		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Minor	Low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants including, but not limited to:</p> <p>pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, heavy metals, ammonia, sulphates, organics, asbestos, nitro compounds, amines, PCB, phosphates, methane and carbon dioxide.</p>	Off-site users – residential, play area, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk at baseline without mitigation
Soil, leachate and groundwater contamination Ground gas	Controlled waters – surface waters (River Tame, Plants Brook, overflow channel, ponds)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
Potential for a range of inorganic and organic contaminants including, but not limited to: pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, heavy metals, ammonia, sulphates, organics, asbestos, nitro compounds, amines, PCB, phosphates, methane and carbon dioxide.	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Minor	Low risk
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions Sites assessed without construction of the Proposed Scheme. 'On-site users' refers to current site users of areas within the land required to construct the Proposed Scheme.					

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Table 24: Construction CSM and qualitative risk assessment for the River Tame realignment and replacement floodplain storage area in Park Hall nature reserve

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination	On-site users – current (LNR)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	N/A	N/A	N/A
Ground gas					
Potential for a range of inorganic and organic contaminants					
Including but not limited to: pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, heavy metals, ammonia, sulphates, organics, asbestos, nitro compounds, amines, PCB, phosphates, methane and carbon dioxide.		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants</p> <p>Including but not limited to: pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, heavy metals, ammonia, sulphates, organics, asbestos, nitro compounds, amines, PCB, phosphates, methane and carbon dioxide.</p>	Off-site users – residential, play area, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium to severe	Moderate/low risk to moderate risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination	Controlled waters – surface waters (River Tame, Plants Brook, overflow channel, ponds)	Groundwater migration, direct run-off from site	Low	Medium to severe	Moderate/low risk to moderate risk
Ground gas					
Potential for a range of inorganic and organic contaminants	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Minor	Low risk
Including but not limited to: pathogens, solvents, acids and alkalis, detergents and bleaches, fuel oils, hydrocarbons, anti-freeze agents, organic solvents, fire-fighting agents, wheel-cleaners, lubricants, hydraulic fluids, heavy metals, ammonia, sulphates, organics, asbestos, nitro compounds, amines, PCB, phosphates, methane and carbon dioxide.	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor to medium	Low risk to moderate/low risk
Notes / assumptions 'On-site users' refers to current site users of areas within the land required to construct the Proposed Scheme. N/A is not applicable, as on-site users have been removed from the construction stage CSM as they will not be present during construction. During construction standard mitigation procedures are assumed to be implemented in accordance with the CoCP. Construction workers have been excluded from assessment due to the use of PPE / risk management. Whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may still be temporary minor adverse effects during the construction period from					

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>ground disturbance in these areas. The adoption of the CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.</p> <p>Ground investigation will be required prior to construction.</p> <p>Assumes construction phase includes remediation that may be required.</p>					

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Table 25: Post-construction CSM and qualitative risk assessment for the River Tame realignment and replacement floodplain storage area in Park Hall nature reserve

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	On-site users – current (LNR)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Low	Minor	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Low	Minor	Low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Off-site users – residential, play area, public open space, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Minor	Very low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface waters (River Tame, Plants Brook, overflow channel, ponds)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Minor	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Minor	Low risk
Notes / assumptions 'On-site users' excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction. With the exception of the Esso pipeline, the majority of the sites considered are off-site sources beyond the construction boundary. The post-construction risks are therefore expected to be the same as for baseline, as remediation will not have been undertaken on these sites.					

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Table 26: Significance of impact during construction and post-construction for the River Tame realignment and replacement floodplain storage area in Park Hall nature reserve

Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – on-site users (LNR)	Low risk	N/A	Low risk	N/A	Negligible
Exposure to groundwater contamination – on-site users (LNR)	Low risk	N/A	Low risk	N/A	Negligible
Exposure to ground gas – on-site users (LNR)	Very low risk	N/A	Very low risk	N/A	Negligible
Exposure to soil contamination – off-site users (residential, play area, public open space, LNR)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (residential, play area, public open space, LNR)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to ground gas – off-site users (residential, play area, public open space, LNR)	Very low risk	Very low risk	Very low risk	Negligible	Negligible

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to ground gas – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Contaminated soil leachate/groundwater and pollution of aquifer	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Contaminated soil leachate/groundwater and impact on surface watercourse	Moderate/low risk	Moderate/low risk to moderate risk	Moderate/low risk	Negligible to minor adverse	Negligible
Impact on property receptors	Low risk	Low risk	Low risk	Negligible	Negligible

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Impact on ecological/ geological designations (Park Hall nature reserve)	Low risk	Low risk to moderate/low risk	Low risk	Negligible to minor adverse	Negligible
Overall significance				Negligible to minor adverse	Negligible
Notes / assumptions A range is in places given as whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may be temporary minor adverse effects during the construction period from ground disturbance. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.					

Detailed risk assessment - Bromford tunnel eastern portal and approach in Castle Bromwich retained cut

Table 27: Detailed risk assessment for the Bromford tunnel east portal and approach in retained cut

Site ID (IDS)	6, 8, 14, 16, 82, 88, and 113 (within construction boundary) 11, 12, 15, 17, 18 and 84 (outside of construction boundary)
Community forum area	Castle Bromwich and Bromford
Site group	Site/area specific : Bromford tunnel eastern portal and approach in retained cut – sites which fall fully / partially within the land required to construct the eastern Bromford tunnel portal and approach, and sites which may influence this construction.
Site title (Site ID) and land use class⁹	<p>Within construction boundary:</p> <p>Castle Bromwich Waste Treatment Site former landfill, currently Tameside Drive Civic Amenity Site and Castle Bromwich Incinerator Bottom Ash Processing Facility (6), class 3 historical land use</p> <p>Hayward Industrial Estate/Castle Bromwich Business Park (8), class 2 current land use</p> <p>British Car Auctions / former Tameside Drive - Langley Drive Landfill Site (14), class 3 current and historical land use</p> <p>Former Tameside Drive - Langley Drive Landfill Site, currently industrial units (16), class 3 current and historical land use</p> <p>Former fertiliser works (82), class 3 historical land use</p> <p>Esso pipeline (88), class 2 current land use</p> <p>Railway land within CFA25 (113), class 2 current and historical land use</p> <p>Outside of construction boundary:</p> <p>Former landfill site, currently industrial units (11, 12 & 15), class 3 current and historical land use</p> <p>Former sewage works and part of aerodrome (84), class 3 historical land use</p> <p>Former abattoir (17 and 18)</p>
Receptors	
Sensitive land use e.g. housing, schools, parks, playgrounds (adjacent and/or <50m)	Housing in Castle Vale and Ward End, Chivnor Primary School, playing field, play area, Park Hall nature reserve
Aquifer e.g. Secondary A or Principal	<p>Superficial: Secondary A (Alluvium / River Terrace Deposits)</p> <p>Bedrock: Secondary B (Mercia Mudstone)</p>
Surface watercourses (adjacent and/or <50m)	River Tame, Plants Brook, overflow channel

⁹ As defined by Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2)

Geological or ecological designations e.g. SSSI or RAMSAR	Park Hall nature reserve
Property e.g. mineral resources, buildings and structures, Grade 1 agricultural land	No significant mineral resources. Residential and commercial buildings and infrastructure present throughout. Buildings and structures (potentially affected by ground gas)
Post-construction development	
6, 8, 14, 16, 82, 88, 113 – Eastern tunnel portal and approach in retained cut. Level at portal approximately 14m below existing ground level.	
11, 12, 15 and 84 – None. Sites are located outside of the land required to construct the Proposed Scheme.	

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Table 28: Baseline CSM and qualitative risk assessment for the Bromford tunnel east portal and approach in retained cut

Source	Receptor	Pathway	Probability	Consequence	Risk without mitigation
Soil, leachate and groundwater contamination Ground gas Potential for a range of inorganic and organic contaminants including but not limited to: heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, fuel oils, solvents, alkalis, herbicides, anti-freeze agents, fire-fighting agents, wheel-cleaners, hydraulic fluids, paints and associated solvents and thinners, rust removers, corrosion inhibitors, sulphates, lubricants, PCB, PAH, ammonium salts, phosphates, pathogens, methane and carbon dioxide.	On-site users – current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Low	Medium	Moderate/low risk
	Off-site users – residential, playing field, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Unlikely	Medium	Low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk without mitigation
<p>Soil, leachate and groundwater contamination</p> <p>Ground gas</p> <p>Potential for a range of inorganic and organic contaminants including but not limited to:</p> <p>heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, fuel oils, solvents, alkalis, herbicides, anti-freeze agents, fire-fighting agents, wheel-cleaners, hydraulic fluids, paints and associated solvents and thinners, rust removers, corrosion inhibitors, sulphates, lubricants, PCB, PAH, ammonium salts, phosphates, pathogens, methane and carbon dioxide.</p>	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Medium	Low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium	Moderate/low risk
	Controlled waters – surface waters (River Tame, Plants Brook, overflow channel)	Groundwater migration, direct run-off from site	Low	Medium	Moderate/low risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Medium	Moderate/low risk
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Medium	Moderate/low risk
<p>Notes / assumptions</p> <p>Sites assessed without construction of the Proposed Scheme.</p> <p>'On-site users' refers to current site users of areas within the land required to construct the Proposed Scheme.</p>					

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Table 29: Construction CSM and qualitative risk assessment for the Bromford tunnel east portal and approach in retained cut

Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination Ground gas Potential for a range of inorganic and organic contaminants including but not limited to: heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, fuel oils, solvents, alkalis, herbicides, anti-freeze agents, fire-fighting agents, wheel-cleaners, hydraulic fluids, paints and associated solvents and thinners, rust removers, corrosion inhibitors, sulphates, lubricants, PCB, PAH, ammonium salts, phosphates, pathogens, methane and carbon dioxide.	On-site users – Current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	N/A	N/A	N/A
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	N/A	N/A	N/A
		Inhalation of ground gases	N/A	N/A	N/A
	Off-site users – residential, playing field, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Medium	Low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Medium	Low risk
		Inhalation of ground gases	Unlikely	Medium to severe	Low risk to Moderate/low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Minor	Very low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
Soil, leachate and groundwater contamination Ground gas Potential for a range of inorganic and organic contaminants including but not limited to: heavy metals, ammonia, acids, organic compounds, inorganic compounds, asbestos, hydrocarbons, fuel oils, solvents, alkalis, herbicides, anti-freeze agents, fire-fighting agents, wheel-cleaners, hydraulic fluids, paints and associated solvents and thinners, rust removers, corrosion inhibitors, sulphates, lubricants, PCB, PAH, ammonium salts, phosphates, pathogens, methane and carbon dioxide.	Off-site users – commercial	Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Minor	Very low risk
		Inhalation of ground gases	Unlikely	Medium to severe	Low risk to moderate/low risk
	Controlled waters – groundwater (Secondary A Aquifer)	Vertical and lateral migration	Low	Medium to severe	Moderate/low risk to moderate risk
	Controlled waters – surface waters (River Tame, Plants Brook, overflow channel)	Groundwater migration, direct run-off from site	Low	Medium to severe	Moderate/low risk to moderate risk
	Property receptors – Buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Low	Medium to severe	Moderate/low risk to moderate risk
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Low	Medium to severe	Moderate/low risk to moderate risk
Notes / assumptions 'On-site users' refers to current site users of areas within the land required to construct the Proposed Scheme. N/A is not applicable, as on-site users have been removed from the construction stage CSM as they will not be present during construction. During construction standard mitigation procedures are assumed to be implemented in accordance with the CoCP. Construction workers have been excluded from assessment due to the					

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Source	Receptor	Pathway	Probability	Consequence	Risk with construction stage mitigation
<p>use of PPE / risk management.</p> <p>Whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may still be temporary minor adverse effects during the construction period from ground disturbance in these areas. The adoption of the CoCP generally results in a low to unlikely probability of a consequence, but in some cases the actual consequence may temporarily increase from that defined at baseline. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.</p> <p>Ground investigation will be required prior to construction.</p> <p>Assumes construction phase includes remediation that may be required.</p>					

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Table 30: Post-construction CSM and qualitative risk assessment for the Bromford tunnel east portal and approach in retained cut

Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas	On-site users – Current (commercial)	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to medium	Very low risk to low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to medium	Very low risk to low risk
		Inhalation of ground gases	Unlikely	Negligible to medium	Very low risk to low risk
	Off-site users – residential, playing field, LNR	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to medium	Very low risk to low risk
		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to medium	Very low risk to low risk
		Inhalation of ground gases	Unlikely	Negligible to medium	Very low risk to low risk
	Off-site users – commercial	Direct contact, ingestion, inhalation of dust/vapour with/from contaminated soils	Unlikely	Negligible to minor	Very low risk

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Source	Receptor	Pathway	Probability	Consequence	Risk with permanent works mitigation
Residual soil, leachate, and groundwater contamination Ground gas		Direct contact, ingestion, inhalation of vapour with/from contaminated waters	Unlikely	Negligible to minor	Very low risk
		Inhalation of ground gases	Unlikely	Negligible to medium	Very low risk to low risk
	Controlled waters – Groundwater (Secondary A Aquifer)	Vertical and lateral migration	Unlikely	Negligible to medium	Very low risk to low risk
	Controlled waters – surface waters (River Tame, Plants Brook, overflow channel)	Groundwater migration, direct run-off from site	Unlikely	Negligible to medium	Very low risk to low risk
	Property receptors – buildings, foundations and services (on-site and off-site)	Exposure to explosive gases	Unlikely	Negligible to medium	Very low risk to low risk
	Ecological/geological designations (Park Hall nature reserve)	Vertical and lateral migration, direct contact	Unlikely	Negligible to medium	Very low risk to low risk
Notes / assumptions 'On-site users' excludes rail passengers (as whilst within trains, will at all routine times be within a controlled environment) and maintenance workers; but includes people at stations/depots or in areas returned to public land after construction. A range may be given as remediation strategies will vary in design to focus on specific contaminative risks at each site. Remediation strategies may involve source removal or pathway intervention as appropriate.					

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Table 31: Significance of impact during construction and post-construction for the Bromford tunnel east portal and approach in retained cut

Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – on-site users (commercial)	Low risk	N/A	Very low risk to low risk	N/A	Negligible to minor beneficial
Exposure to groundwater contamination - on-site users (commercial)	Low risk	N/A	Very low risk to low risk	N/A	Negligible to minor beneficial
Exposure to ground gas – on-site users (commercial)	Moderate/low risk	N/A	Very low risk to low risk	N/A	Minor beneficial to moderate beneficial
Exposure to soil contamination – off-site users (residential, playing field, LNR)	Low risk	Low risk	Very low risk to low risk	Negligible	Negligible to minor beneficial
Exposure to groundwater contamination – off-site users (residential, playing field, LNR)	Low risk	Low risk	Very low risk to low risk	Negligible	Negligible to minor beneficial
Exposure to ground gas – off-site users (residential, playing field, LNR)	Low risk	Low risk to moderate/low risk	Very low risk to low risk	Negligible to minor adverse	Negligible to minor beneficial

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Exposure to soil contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to groundwater contamination – off-site users (commercial)	Very low risk	Very low risk	Very low risk	Negligible	Negligible
Exposure to ground gas – off-site users (commercial)	Low risk	Low risk to moderate/low risk	Very low risk to low risk	Negligible to minor adverse	Negligible to minor beneficial
Contaminated soil, leachate/groundwater and pollution of aquifers	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Contaminated soil, leachate/groundwater and impact on surface watercourses	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Impact on property receptors	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial

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Contaminant linkage	Baseline	Construction	Post-construction	Construction impact	Post-construction impact
	Risk	Risk	Risk	Significance	Significance
Impact on ecological/geological designations	Moderate/low risk	Moderate/low risk to moderate risk	Very low risk to low risk	Negligible to minor adverse	Minor beneficial to moderate beneficial
Overall significance				Negligible to minor adverse	Negligible to moderate beneficial
Notes / assumptions A range is in places given as whilst the CoCP will make it unlikely that there will be adverse consequences, it is considered that there may be temporary minor adverse effects during the construction period from ground disturbance. Mitigation measures over and above the CoCP are detailed in the Volume 2 report for this study area.					

4 Inspections notes and other site data

4.1.1 This section presents the following data:

- site inspection notes for those key potentially contaminated sites visited during the study period;
- names of ground investigation or contamination survey reports reviewed during the study period; and
- any other relevant site data.

4.1.2 The remainder of this section presents the inspection notes and other data for the sites.

4.1.3 Table 32 details the site inspection notes from visits made to sites. The site inspection notes are appended to this report.

Table 32: Site inspection notes

Date	Site	No. pages
4 September 2012	Prologis Park, Birmingham B76 9EH	4
4 September 2012	Public open space in area of historic landfill	4
24 May 2013	Ballast Phoenix (Castle Bromwich Waste Treatment Site)	7
4 September 2012	Castle Bromwich Business Park, B35 6DQ	4
6 July 2012	The Fort Industrial Park, Birmingham, B35 7AR	7
6 July 2012	Jaguar Land Rover Holding Facility, Castle Bromwich, Castle Vale, Birmingham, B35 7RA	6
21 August 2012	Dunlop Tyres, Wood Lane, B24 9FD	7

4.1.4 Other relevant site data that has been reviewed is detailed in Table 33. Report review summaries of these documents are appended to this report.

Table 33: Other relevant site data

Site	Document description	No. pages of report review appended
Fort Dunlop, Birmingham	Buckingham Group Contracting Ltd; Fort Dunlop, Birmingham; Section E site remediation Validation report volume I and II of II	2
Fort Dunlop, Birmingham	Buckingham Group Contracting Ltd; Fort Dunlop, Birmingham; Section C site remediation Validation report	1
Fort Dunlop, Birmingham	Prologis Developments Limited; Fort Dunlop, Birmingham; Phase 2 environmental assessment	2
Fort Dunlop, Birmingham	BWB Environmental, Prologis Developments Limited, Fort	1

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	Dunlop, Birmingham, phase 1 Environmental assessment, January 2001 (Ref: ENV083HE/01/V1)	
Fort Dunlop, Birmingham	BWB Environmental, Prologis Developments Limited, Fort Dunlop, Birmingham, phase 2 Environmental assessment, March 2001 (Ref: ENV083HE/02/V2)	1
South of Farnborough Rd, Castle Vale	British Geotechnical, Ground investigation for land south of Farnborough Road, Castle Vale, Birmingham, October 1997 (Ref: BG2417)	1
Fort Dunlop, Birmingham	BWB Environmental, Buckingham Group Contracting Ltd, Fort Dunlop, Birmingham, 60% section A site remediation, November 2001 (Ref: MLA/IDN/JW/ENV083HE/08/V1)	1
Fort Dunlop, Birmingham	BWB Environmental, Buckingham Group Contracting Ltd, Fort Dunlop, Birmingham, 40% section A site remediation, October 2001 (Ref: MLA/SLP/IDN/JW/ENV083HE/04/V3)	1
Cadbury Drive, Castle Vale	The Sprigg Little Partnership, Cadbury Drive Castle Vale Birmingham for Wimpey Homes Ltd, site supervision report, March 1997 (Ref: TEL/JPS/96070)	1
276 Bromford Lane	Astral Developments Ltd, 276 Bromford Lane, human health and controlled waters risk assessment, Ref: 200801/L	1
276 Bromford Lane	John Sisk & Son Ltd, development at 276 Bromford Lane, remediation validation report, 2nd issue, 17 June 2002 (Ref: 13010036)	1
Cadbury Drive, Castle Vale	Pro-Soil Surveys Ltd, Takare Plc, Cadbury Drive, Castle Vale, Birmingham, appraisal of ground conditions, November 1995 (Ref: R/5/0005)	1
Fort Dunlop, Birmingham	Geotechnical Developments (UK) Ltd, geoenvironmental and geotechnical report on ground investigation at Fort Dunlop, Birmingham, 4 December 2003 (Ref: P3002/Lo6)	1
Fort Dunlop, Birmingham	BWB Environmental, Buckingham Group Contracting Ltd, Fort Dunlop, Birmingham, hydrocarbon contamination areas A, B, C and D validation completion report, volume I of II, September 2003 (Ref: ENV083HE/11/V2)	1
Cadbury Drive, Castle Vale	Birmingham City Laboratories, preliminary site assessment for land at Cadbury Drive, Castle Vale, Birmingham, 26 March 1997 (Ref: SI/96/052699)	1
Cadbury Drive, Castle Vale	Birmingham City Laboratories, site investigation for land at Cadbury Drive, Castle Vale, Birmingham, 10 June 1997 (Ref: SI/97/052699A)	1
Power station adjacent to Fort Dunlop	Fort Dunlop power plant risk assessment	1
Power station adjacent to Fort Dunlop, Castle Bromwich	Report on a site investigation for proposed combined heat and power (CHP) station	1
Birmingham warehouse site. Dunlop Way, Erdington (B&Q and Dunlop)	Preliminary site investigation and environmental appraisal	1

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Crawford Street, Saltley	Ashted Centre, trial pit logs	1
Adjacent to Fort Dunlop, Castle Bromwich	Interpretative report on site investigation, proposed Fort Dunlop power plant	1
Birmingham warehouse site. Dunlop Way, Erdington (B&Q and Dunlop)	PII ground investigation	1
Tameside Drive, Castle Bromwich	Geotechnical site investigation, Tameside Drive, Castle Bromwich	1
Tameside Drive, Castle Bromwich	Phase I contamination assessment, Tameside Drive, Castle Bromwich	1
Former Regency International Plc site, Tameside Drive, Castle Bromwich	Preliminary site investigation	2
Jaguar Land Rover Facility, Chester Road, Birmingham	Application to surrender waste management license at Jaguar Cars Ltd, Chester Road, Birmingham, B35 7RA	1
Fort Dunlop, Birmingham	Geoenvironmental and geotechnical report on ground investigation at Fort Dunlop, Birmingham	2
Castle Bromwich Refuse Disposal Works, Birmingham	Site investigation and methane monitoring point installation at Castle Bromwich Refuse Disposal Works – factual report [LF5] and interpretative report for Castle Bromwich, Birmingham [LF5]	2
Former Severn Trent properties – Midpoint II, Minworth (Prologis)	Final Report Environmental Risk Assessment, Former Severn Trent Properties – Midpoint II, Minworth (Ref. No. 933385(4))	2
Former Severn Trent properties – Midpoint II, Minworth (Prologis)	Final risk-based remedial strategy – ProLogis Park Minworth. File provided also included various letter correspondence.	3
The NDC De-Pollution Plant, Gravelly Hill Industrial Park, Birmingham	Geotechnical and Geoenvironmental Report, The NDC De-Pollution Plant, Birmingham (Report No.36785-001)	2

5 Geological SSSI and local geological sites

- 5.1.1 This section presents the following data:
- citation data for geological SSSI;
 - citation data for LGS, formerly called regionally important geological sites (RIGS); and
 - any other relevant site data.
- 5.1.2 The remainder of this section is blank as there are no geological SSSI or LGS within the study area.

6 Mining and minerals data

- 6.1.1 This section presents the following data relating to mining and minerals information:
- details of planning data for minerals sites;
 - lists of marl pits in each study area; and
 - data from The Coal Authority.
- 6.1.2 The remainder of this section is blank as there is no mineral extraction or mining activity within the study area or designations for any future mining activity.

7 References

DEFRA and Environment Agency (2002), *Potential Contaminants for the Assessment of Land*. Environment Agency.

Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ramsar (Iran), 2 February 1971. UN Treaty Series No. 14583. As amended by the Paris Protocol, 3 December 1982, and Regina Amendments, 28 May 1987.

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Buckingham Group Contracting Ltd; Fort Dunlop, Birmingham; Section E Site Remediation Validation Report Volume I and II of II
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SITE LOCATION:	Fort Dunlop, Birmingham
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DATE PREPARED	December 2002 / August 2003	DATE REVIEWED	18 Dec 2012
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AUTHORED BY:	The BWB Partnership Limited (BWB)	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>A remediation strategy for Section E of the Fort Dunlop site was produced in March 2001 and following a quantitative risk assessment undertaken by BWB in October 2001 and consultation with the EA the site action criteria for copper and zinc were amended to 2000 mg/kg each and remediation principles verbally agreed. The remediation strategy was designed to ensure that after demolition and remediation Section E would be suitable for warehousing/distribution end use.</p> <p>Section E is centred at NG ref. SP 1270 9040 in the eastern sector of the Fort Dunlop site. Prior to demolition, the western part of Section E was occupied by four industrial buildings used predominantly for tyre manufacturing and storage (including chemical storage tanks). Administration offices, sales and a canteen occupied the central area, whilst the eastern part was occupied by technical offices, a tyre storage warehouse and research and laboratory facilities. A car park and open grassed area occupied the south eastern quadrant.</p> <p>The sides of underground structures and basements were demolished to 2.00 m bgl. Any base floor slabs were punctured to allow for groundwater ingress. Excavations were reinstated with site-won demolition material in compacted layers. Hot-spots of soil containing elevated contamination were excavated (total of 630 m³ was removed from site).</p> <p>As-built drawings for drainage infrastructure and new utilities and a copy of the EA discharge consent for surface water drainage are provided. At the time of writing, adoption of the foul water pumping system and rising main by the authority will not take place until there are multiple users of the service.</p>

SCOPE OF REPORT
Summary of environmental consultancy support provided during demolition/remediation works at the Fort Dunlop site, Birmingham. The report covers the remediation and validation of Section E.

CONCLUSIONS	
<p>Environmental remedial works have been completed over Section E. The validation testing of the in-situ and re-profiled materials show concentrations of contaminants below the site action levels for soil and or leachate as detailed in the site remediation strategy. As such it is concluded that the in-situ and re-profiled soil beneath Section E are suitable for the proposed warehousing/distribution end use.</p> <p>Final Correspondence was received from the EA on 25th July 2003 acknowledging that the objectives of the soil remedial programme in Section E appear to have been met and that the risk of contamination from soils to 'controlled waters' has been significantly reduced. It does go on to express the opinion that residual contamination may remain in soils and that it would have been helpful to obtain groundwater quality data to demonstrate no risk from groundwater. BWB replied on 29th July to advise that they considered this a statement, not a request and as such included the EA's response in their report as final.</p>	
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	N/A (although note that correspondence with the EA does not deal with human health. Correspondence indicates that the remediation strategy focussed on controlled waters and it is not made clear to what extent human health has been considered)

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Buckingham Group Contracting Ltd; Fort Dunlop, Birmingham; Section C Site Remediation Validation Report
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SITE LOCATION:	Fort Dunlop, Birmingham
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DATE PREPARED	December 2002	DATE REVIEWED	19 Dec 2012
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AUTHORED BY:	The BWB Partnership Limited (BWB)	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>A remediation strategy for the whole of the Fort Dunlop site was prepared and agreed with BCC Environmental Services and the EA, designed to ensure that the whole site is suitable for warehousing/distribution end use. The purpose of this report is to demonstrate that the appropriate remediation has been undertaken to allow for this.</p> <p>The study area is centred at NG ref. SP 1270 9040 in the eastern sector of the Fort Dunlop site. Prior to demolition, the site was occupied by five industrial buildings used predominantly for tyre manufacture and storage, also including boiler/compression house, foundry, site garage and car park.</p> <p>The sides of underground structures and basements were demolished to 2.00 m bgl. Any base floor slabs were punctured to allow for groundwater ingress. Excavations were reinstated with site-won materials generated from demolition. Hot-spots of soil containing elevated contamination were excavated (total of 100 m³ was removed from site).</p>

SCOPE OF REPORT
Summary of environmental consultancy support provided during demolition/remediation works at the Fort Dunlop site, Birmingham. The report covers the remediation and validation of Section C.

CONCLUSIONS
<p>The environmental remedial works have been completed in accordance with the proposals set out. The validation testing of the in-situ and re-profiled materials show concentrations of contaminants below the site action levels for soil and or leachate as detailed in the site remediation strategy.</p> <p>It is concluded that the in-situ and re-profiled soils beneath the study area are suitable for the proposed warehousing/distribution end use.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	N/A
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Prologis Developments Limited; Fort Dunlop, Birmingham; Phase 2 Environmental Assessment
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SITE LOCATION:	Fort Dunlop, Birmingham
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DATE PREPARED	March 2001	DATE REVIEWED	19 Dec 2012
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AUTHORED BY:	The BWB Partnership Limited (BWB)	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>Purpose of GI was to provide information to determine the contamination status of the site prior to demolition as informed by the Phase I. Site is located on RTD over MMG over Sherwood Sandstone. Shallow groundwater was identified either towards the base of the RTD or top of the MMG at between ~1.00 m and 5.00 m depth. The perched groundwater generally flows in a SE direction and is likely to be in hydraulic continuity with the canalised River Tame to the south.</p> <p>Buried concrete was encountered in 17 holes generally located around Area 4. Concrete slabs, other concrete/brick foundations and evidence of former air raid shelters were also encountered.</p> <p>Heavy metals locally identified in the ashy MG. PAH identified in MG beneath the mounded area adjacent to SE car park (Area1). Hydrocarbons present in MG, RTD and groundwater in Area 4; appears to be four sources (Areas A, B, C and D). Pollutant linkages identified, namely between the hydrocarbon contamination in soil and shallow groundwater.</p>

SCOPE OF REPORT
Phase 2 Environmental Assessment of the site located at Fort Dunlop, Birmingham.

CONCLUSIONS	
<p>It was recommended that, in areas of elevated inorganic/organic contamination, leachate testing be undertaken with the results used to determine whether the or not the material can stay on site. Hydrocarbon contamination in Area 4 to be remediated as part of remediation strategy for the site. Most appropriate technique would involve two stages –</p> <ul style="list-style-type: none"> • Remove free phase product (skimming) – pre-demolition to ensure additional pathway creation is avoided; and • In-situ bioremediation – post-demolition <p>Areas of landscaping will require import of clean sub-soil and topsoil to provide a rooting zone. Greater thicknesses will be needed should trees be intended. Based on the investigation results and assuming hydrocarbon contamination is removed and subsequent monitoring reveals acceptable gas levels, then gas protection measures may not be considered necessary. It would be prudent to undertake a gas spike survey of the remaining areas of the site after the demolition has been completed.</p> <p>The investigation reported only covered accessible areas across the site prior to demolition. Further GI will be required after demolition to cover previously inaccessible areas.</p>	
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Yes although note subsequent remediation/validation reports which render this N/A.

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	BWB Environmental, Prologis Developments Limited, Fort Dunlop, Birmingham, Phase 1 Environmental Assessment, January 2001 (Ref: ENV083HE/01/V1)
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SITE LOCATION:	SP125 903. Fort Dunlop Works
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DATE PREPARED	January 2001	DATE REVIEWED	4 th October 2012
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AUTHORED BY:	BWB Environmental	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Desk study - environmental issues/liabilities

SCOPE OF REPORT
Report on all available information, including site observations made between December 2000 and January 2001 and verbal reports from Dunlop Tyres Ltd, to provide an opinion on potential environmental issues/liabilities

CONCLUSIONS
<p>Fort Dunlop Tyre factory from at least 1918. Potentially contaminative activities at site.</p> <p>Soil & GW contamination from:</p> <ul style="list-style-type: none"> • Former solvent store & oil/diesel storage tanks in N • Hydrocarbons in soil & GW from former chimney bases used to dispose of waste oil, resealed waste oil tank & offsite sources (fuel storage depots to W & bus depot to NW) • PCBs from 34 transformers/capacitors • PAHs – historical leakage /spillage from infilled UG naphthalene storage tank • Suds oil store & paint scrubber plant. <p>Soil contamination from</p> <ul style="list-style-type: none"> • Dunlop materials dump in SE • Heavy metals - ashy material in MG & on sports field adjacent to B&F canal – dredging from old nickel works • Asbestos – soil & buildings • Residue from burning of tyres in the west in 1930s <p>Elevated methane & CO2 in west of site.</p> <p>Shallow GW in RTP (2.50m to 3.40m bgl. Generally flows to SE, probably in continuity with canalised R Tame to S.</p> <p>⇒ Phase 2 GI recommended.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	HIGH. Although subsequent GI/remediation works may have mitigated this.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	BWB Environmental, Prologis Developments Limited, Fort Dunlop, Birmingham, Phase 2 Environmental Assessment, March 2001 (Ref: ENV083HE/02/V2)
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SITE LOCATION:	SP125 903. Fort Dunlop Works
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DATE PREPARED	March 2001	DATE REVIEWED	4 th October 2012
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AUTHORED BY:	BWB Environmental	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Phase 2 GI – provide preliminary information on ground conditions at site to determine contamination status prior to demolition.

SCOPE OF REPORT
Interpretative Phase 2 GI report. Investigation only covered accessible areas prior to demolition.

CONCLUSIONS
<p>Ground conditions encountered:</p> <ul style="list-style-type: none"> Buried concrete and brick foundations across the site Former air raid shelters <p>Sources of contamination</p> <ul style="list-style-type: none"> Heavy metals in ashy materials – localised hotspots PAHs in MG beneath mounded area adjacent to SE car park (area 1) Hydrocarbons in MG, RTP & GW in area 4. 4 likely sources: <p>Main linkage</p> <ul style="list-style-type: none"> Hydrocarbon contamination in soil & shallow GW <p>Way forward</p> <ul style="list-style-type: none"> Leachate testing in area of inorganic, organic contamination to determine if can remain insitu Remediation of hydrocarbon contamination in Area 4 in 2 stages: removal of free product followed by insitu bioremediation Post remediation gas monitoring <p>⇒ Further GI recommended after demolition to access previously inaccessible areas.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	HIGH. Although subsequent GI/remediation works may have mitigated this.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	British Geotechnical, Ground Investigation for Land South of Farnborough Road Castle Vale Birmingham, October 1997 (Ref: BG2417)		
SITE LOCATION:	South of Farnborough Rd, Castle Vale		
DATE PREPARED	October 1997	DATE REVIEWED	4 th October 2012
AUTHORED BY:	British Geotechnical	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Determine general ground and groundwater conditions in relation to a proposed scheme of redevelopment involving the construction of low rise housing.			
SCOPE OF REPORT			
Factual record of fieldworks, but includes information on geotechnical characteristics of the strata and comments relating to soil contamination. 10 TPs and 10 CP BHS. 6 standpipes. Monitoring results are in separate addendum.			
CONCLUSIONS			
Heavy metals above trigger values. Cover system needs in garden areas.			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		LOW – cover system likely to have been adopted.	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	BWB Environmental, Buckingham Group Contracting Ltd, Fort Dunlop, Birmingham, 60% Section A site remediation, November 2001 (Ref: MLA/IDN/JW/ENV083HE/08/V1)		
SITE LOCATION:	SP 1230 9050, Fort Dunlop, Birmingham, 60% Section A (new warehouse/distribution building area in northern sector)		
DATE PREPARED	November 2001	DATE REVIEWED	4 th October 2012
AUTHORED BY:	BWB Environmental	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Report on remedial works and validation testing.			
SCOPE OF REPORT			
12 WS BHs. Validation testing of soils.			
CONCLUSIONS			
Hotspots of VOCs and inorganic contamination were removed. TPH hotspot that failed validation testing was removed. In-situ and re profiled soils beneath the study area are suitable for proposed warehousing/distribution end use.			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		LOW – Remediation of contamination hotspots.	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	BWB Environmental, Buckingham Group Contracting Ltd, Fort Dunlop, Birmingham, 40% Section A site remediation, October 2001 (Ref: MLA/SLP/IDN/JW/ENV083HE/04/V3		
SITE LOCATION:	SP 1230 9050, Fort Dunlop, Birmingham, 40% Section A & new office building area.		
DATE PREPARED	October 2001	DATE REVIEWED	4 th October 2012
AUTHORED BY:	BWB Environmental	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Present evidence that remediation has been carried out to the standard necessary for the proposed end use. Remediation strategy was agreed with BCC Environmental Services.			
SCOPE OF REPORT			
Report on remediation and validation of 40% of the new warehouse/distribution building area.			
CONCLUSIONS			
Remedial works have been completed over study area in accordance with the proposals. The validation testing of the in-situ and re-profiled materials in the study area shows concentrations of contaminants below the action levels for soil and/or leachate. Soils and re-profiled soils are therefore suitable for the proposed warehousing/distribution end use.			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low		

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	The Sprigg Little Partnership, Cadbury Drive Castle Vale Birmingham for Wimpey Homes Ltd, Site Supervision Report, March 1997 (Ref: TEL/JPS/96070)		
SITE LOCATION:	Cadbury Drive, Castle Vale		
DATE PREPARED	March 1997	DATE REVIEWED	15 th October 2012
AUTHORED BY:	The Sprigg Little Partnership	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Reporting on site supervision to monitor excavation of contaminated material.			
SCOPE OF REPORT			
Reporting on partial inspection of ground remediation works at Cadbury Drive, Castle Vale.			
CONCLUSIONS			
Soil replacement work has been carried out in an acceptable manner. All contaminated soil appears to have been removed for a minimum depth of 1m within the proposed gardens of plots 1-10 and 0,5m within rear gardens of remaining plots.			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		Low	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Astral Developments Ltd, 276 Bromford Lane, Human Health and Controlled Waters Risk Assessment, Ref: 200801/L
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SITE LOCATION:	276 Bromford Lane
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DATE PREPARED	NO DATE	DATE REVIEWED	16 th October 2012
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AUTHORED BY:	WSP	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Quantitative risk assessment of ground and groundwater contamination (Previous WSP investigations found diesel groundwater contamination, associated with an underground storage tank (western boundary of Area 1) and minor soil and groundwater diesel contamination, associated with above ground tanks and historical pipe burst. Also relatively low metal soil and groundwater contamination).

SCOPE OF REPORT
Quantitative risk assessment of ground and groundwater contamination to assess risk to human health and controlled waters under proposed future site use, and to determine what remediation measures are required to mitigate risks. Incorporates amendments after discussions with the EA (hydraulic conductivity and sensitivity analysis for degradation rates and hydrocarbon contamination).

CONCLUSIONS
<p>Leakage from UGT resulted in thin layer of free phase diesel extending 30m to southeast. TPH in groundwater present LT human health risk via indoor and outdoor inhalation. Migration of TPH to River Tame generally presents a low risk of significant impact, but could exceeds EA target level of 0.02mg/l.</p> <p>Recommendations</p> <ul style="list-style-type: none"> • Removal of underground storage tank and surrounding contamination • Dewatering of trenches • Ventilation measures within buildings situated over heavily contaminated area • Treatment and/or removal of heavily contaminated groundwater/free phase product. • Gas protection measures • Restriction of development over contaminated area • Clean cover system in all landscaped areas • Groundwater treatment – oil water separator, aerobic treatment tank and activated carbon polishing • LT monitoring to demonstrate free phase diesel is being naturally attenuated within capillary fringe and dissolved phase mitigated by dilution within sand & gravel. <p>⇒ Validation monitoring and report required.</p> <p>⇒ Consult with EHO at Bham</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low – moderate - providing recommendations have been adhered to.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	John Sisk & Son Ltd, Development at 276 Bromford Lane, Remediation Validation Report, 2 nd Issue, 17 th June 2002 (Ref: 13010036)		
SITE LOCATION:	276 Bromford Lane		
DATE PREPARED	17 th June 2002	DATE REVIEWED	16 th October 2012
AUTHORED BY:	John Sisk & Son Ltd	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Validation report confirming remediation works.			
SCOPE OF REPORT			
Validation report confirming remediation works – removal of identified sources of contamination and bioremediation of soils to validation target of 1000mg/kg of hydrocarbon, and removal of NAPL from groundwater.			
CONCLUSIONS			
All but one test conformed to soil remedial target. Failed test was tested for leachability and confirmed to be below target level.			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		Low – report confirms remediation carried out.	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Pro-Soil Surveys Ltd, Takare Plc, Cadbury Drive, Castle Vale, Birmingham, Appraisal of Ground Conditions, November 1995 (Ref: R/5/0005)		
SITE LOCATION:	Cadbury Drive, Castle Vale		
DATE PREPARED	17 th June 2002	DATE REVIEWED	16 th October 2012
AUTHORED BY:	Pro-Soil Surveys Ltd	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Summarise relevant information in reports supplied by Takare plc in respect to contamination and landfill gas issues and make assessment of likely foundation solutions.			
SCOPE OF REPORT			
Summarise relevant information in reports supplied by Takare plc in respect to contamination and landfill gas issues and make assessment of likely foundation solutions.			
CONCLUSIONS			
<p>Some low level contamination when compared to ICRCL.</p> <p>Insignificant methane but low levels of carbon dioxide (up to 13.5%) therefore some gas protection measures needed.</p>			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		Low-moderate – provided gas protection measures were included.	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Geotechnical Developments (UK) Ltd, Geo Environmental and Geotechnical Report on Ground Investigation at Fort Dunlop, Birmingham, 4 th December 2003 (Ref: P3002/L06)
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SITE LOCATION:	Fort Dunlop
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DATE PREPARED	4 th December 2003	DATE REVIEWED	16 th October 2012
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AUTHORED BY:	Geotechnical Developments (UK) Ltd	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
To inform proposals for redevelopment (refurbishment of interior of building and extension of this building to include hotel, associated underground services and limited landscaped areas, underground and above ground car park.

SCOPE OF REPORT
Detail desk study research, findings of GI, including gas and groundwater monitoring. Provide interpretative assessment of ground conditions with regards to the proposed development.

CONCLUSIONS
<p>Only significant plausible linkage is ingestion of contaminated soil (locally highly elevated phytotoxic and toxic metals). Provision of minimum 300mm cover system in any landscaped areas.</p> <p>Limited groundwater contamination. Potential for leaching of metals, from localised contamination. Remedial measures not considered warranted as considered to provide on limited beneficial impact.</p> <p>No methane, CO2 up to 11%, Max flow of 18ml. Gas protection measures required.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Moderate – Still potential for leaching of metals and migration to River Tame.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	BWB Environmental, Buckingham Group Contracting Ltd, Fort Dunlop, Birmingham, Hydrocarbon Contamination Areas A, B, C and D Validation Completion Report, Volume I of II, September 2003 (Ref: ENV083HE/11/V2)
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SITE LOCATION:	Fort Dunlop - Hydrocarbon Contamination Areas A, B, C and D SP 1235 9035
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DATE PREPARED	September 2003	DATE REVIEWED	16 th October 2012
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AUTHORED BY:	BWB Environmental	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Remediation and validation of four areas of the site containing elevated levels of hydrocarbons. Remediation strategy was agreed with BCC Environmental Services and in principal with EA, pending a QRA.

SCOPE OF REPORT
To demonstrate that the remediation has been carried out in accordance with and to standards agreed.

CONCLUSIONS
<p>Remediation works completed.</p> <p>Approx 7,450 gallons of free phase hydrocarbons removed and in situ bioremediation of 5560m3 of soil with elevated TPH and PAH, to a maximum depth of 6m bgl.</p> <p>Approx 2005m3 of hydrocarbon contaminated soils have been removed from site.</p> <p>Results of up and down gradient of treated areas (i.e. northern site boundary) groundwater monitoring indicate that on occasion hydrocarbon contamination is entering from an offsite source.</p> <p>Small peaks of contamination randomly occurred during remediation (PAH in Spring 2002), but no significant contamination from site at southern perimeter boreholes.</p> <p>Validation testing confirms that TPH and PAH levels have been significantly lower to comply with standards of remediation strategy. Areas are therefore suitable for proposed warehouse/distribution end use and do not pose a risk to River Tame.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low – validation testing indicates no residual risk.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Birmingham City Laboratories, Preliminary Site Assessment for Land at Cadbury Drive, Castle Vale, Birmingham, 26 th March 1997 (Ref: SI/96/052699)
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SITE LOCATION:	Cadbury Drive, Castle Vale
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DATE PREPARED	26 th March 1997	DATE REVIEWED	17 th October 2012
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AUTHORED BY:	Birmingham City Laboratories	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Desk study to enable design of a second phase of site investigation.

SCOPE OF REPORT
Compiled from selective information obtained from records held by Bham City Council, British Geological Society, OS, Industrial Research Laboratories, and visual site inspection.

CONCLUSIONS
<p>Potential for a wide range of contaminants. Preliminary GI and GI on land to the north indicated potential presence of heavy metal contaminants, elevated sulphates. Also potential for gas works waste and a leak from one of the high pressure oil pipelines. Potential biohazards from deposition of wastes from adjacent sewage, soap and fertiliser works Potential for hazardous gases (insitu generation and/or from offsite sources)</p> <p>⇒ Comprehensive contamination testing programme is recommended. GI to include installations for gas monitoring.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	High – until proven otherwise.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Birmingham City Laboratories, Site Investigation for Land at Cadbury Drive, Castle Vale, Birmingham, 10 th June 1997 (Ref: SI/97/052699A)		
SITE LOCATION:	Cadbury Drive, Castle Vale		
DATE PREPARED	10 th June 1997	DATE REVIEWED	17 th October 2012
AUTHORED BY:	Birmingham City Laboratories	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Site investigation to inform proposed redevelopment as residential.			
SCOPE OF REPORT			
Details findings of main GI, provides information on contamination levels and also about subsoil and groundwater table conditions for foundation design and associated engineering works.			
CONCLUSIONS			
<p>Evidence of leaching of metallic contamination. No other significant chemical contamination. No evidence of sewage waste and lab testing confirmed absence of anthrax. As uneconomical to remove all contaminated material, clean material should be imported in garden and landscaped areas.</p> <p>Gas – methane up to 0.3%, CO2 8.56%. Gas protection measures required, ideally passive system.</p>			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		Moderate. Inorganic contamination to remain insitu.	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Fort Dunlop Power Plant Risk Assessment
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SITE LOCATION:	Power station adjacent to Fort Dunlop
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DATE PREPARED	March 1997	DATE REVIEWED	07/02/13
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AUTHORED BY:	Ground Solutions Group Limited	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>Appendix A of a document detailing the methods of how various conditions of the 1989 Electricity Act are to be addressed during construction of Fort Dunlop's power plant.</p> <p>Geoenvironmental risk assessment identifying the remedial options available to deal with contamination due to previous adjacent site uses as former chemical works and former power station.</p>

SCOPE OF REPORT
<p>Review of previous site investigation data (Soils Engineering Limited, 1981 and Foundation and Exploration Services, 1996) to assess merits of different remedial options.</p>

CONCLUSIONS
<p>Concluded that site was indeed contaminated but that leachability was low and not affecting the groundwater in the underlying River Terrace Deposits. However, contaminative activities so concluded that contaminants may migrate on to the site.</p> <p>As such, it is not deemed 'Contaminated Land' according to the Environment Act 1995 and no pollutant linkage is present.</p> <p>Recommended that capping would be the most appropriate remedial measure prior to development.</p> <p>Main document reports that these recommendations should be adopted and the site should be capped with impermeable asphalt.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Moderate for excavation and if capping not undertaken, Low otherwise.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Report on a Site Investigation for Proposed CHP Station		
SITE LOCATION:	Power station adjacent to Fort Dunlop, Castle Bromwich		
DATE PREPARED	November 1981	DATE REVIEWED	07/02/13
AUTHORED BY:	Soils Engineering Limited	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Predominantly geotechnical site investigation prior to development of power plant and assessment in relation to foundation design.			
SCOPE OF REPORT			
7 boreholes drilled to 10m, U100 samples taken, CPT testing, disturbed soil and groundwater (immediately following drilling) sampling.			
CONCLUSIONS			
<p>Geological sequence found: Made Ground 0.5 – 2.3m thick (1m average) Alluvium ~0.5 -2m thick River Terrace Gravel ~2m thick (max. 3m) Mercia Mudstone 3.55 – 5.8m bgl to depth</p> <p>Water table 2.35 – 3.55m bgl (average 80m aOD)</p>			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		N/A	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Preliminary Site Investigation and Environmental Appraisal
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SITE LOCATION:	Birmingham Warehouse Site. Dunlop Way, Erdington (B&Q and Dunlop)
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DATE PREPARED	March 1997	DATE REVIEWED	07/02/13
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AUTHORED BY:	Cox Turner Morse Environmental Limited	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Desk study, site investigation and preliminary environmental assessment of Dunlop Adhesives (glue/bitumen manufacturing) prior to redevelopment into B&Q superstore including warehouses, garden centre, bulk storage area and associated parking.

SCOPE OF REPORT
<p>Desk study, site investigation and preliminary environmental assessment.</p> <p>Six CP boreholes to 6.00 – 8.42 m depth and nine window sample holes to 1.7-4.5m depth. Numerous soil and groundwater samples for chemical testing.</p>

CONCLUSIONS
<p>MG to 2.0m depth max. Alluvium 0.15 – 0.75m thick (1.5 - 2.9m bgl) RTG 0.4 - 3.0m thick (1.6 - 3.5m bgl) Mercia Mudstone</p> <p>Groundwater 79.15 - 19.67m aOD</p> <p>Methane up to 30.9%v/v, CO₂ >1.5% v/v (max. 4.4% v/v). As, Cu, Pb, Ni, Zn, phenols, sulphate, range of VOCs exceed thresholds on soils and waters.</p> <p>Recommend that significant material removal will be required but additional investigation needed to confirm remedial extent required.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	High
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Ashted Centre, Trial Pit Logs		
SITE LOCATION:	Crawford Street, Saltley		
DATE PREPARED	13/11/86	DATE REVIEWED	07/02/13
AUTHORED BY:	Johnson Poole & Bloomer	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Factual report of trial pit logs and analysis showing elevated levels of sulphate, toluent extractable contaminants and total cyanide.			
SCOPE OF REPORT			
Summary of trial pits and numerous soil analyses.			
CONCLUSIONS			
Council record sheet states that accompanying letter proposed that surface scrape of the site should be undertaken and buried structures and tanks excavated. Spent oxide ("Blue Billy") was also removed. Estimated that 7000m ³ removed. The site was capped with 2m of inert material. Letter on file also states that 0.15m layer of marl/clay was used as a clean capping layer across the site.			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low to Moderate		

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Interpretative Report on Site Investigation, Proposed Fort Dunlop Power Plant
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SITE LOCATION:	Adjacent to Fort Dunlop, Castle Bromwich
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DATE PREPARED	February 1997	DATE REVIEWED	07/02/13
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AUTHORED BY:	Foundation and Exploration Services	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Interpretative report on site investigation including borehole and field testing records, laboratory test results and assessment of foundation design and comments of site contamination.

SCOPE OF REPORT
Six boreholes to up to 11.0m bgl with disturbed and U100 sampling and SPT/CPTs. Four installed as monitoring wells. Eight trial pits to up to 3.1m bgl. Mont

CONCLUSIONS
Made Ground 1.0 - 2.7m depth Alluvium 0.5 – 2.4m thick RTG 4.6 – 5.4m depth Mercia Mudstone to depth Groundwater table 3.02 – 3.83 bgl Slightly elevated Cu in groundwater. Slightly elevated As, Cd, Pb, Hg, Cu, Zn, TEM and PAH in soils. – Risk assessment deemed not significant.

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	P11 Ground Investigation
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SITE LOCATION:	Birmingham Warehouse Site. Dunlop Way, Erdington (B&Q and Dunlop)
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DATE PREPARED	September 1999	DATE REVIEWED	07/02/13
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AUTHORED BY:	Cox Turner Morse Limited	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Full phase 2 ground investigation following closure of Dunlop Adhesives prior to redevelopment as B&Q superstore and associated storage and car parking.

SCOPE OF REPORT
Site walkover, 15 trial pits for sampling

CONCLUSIONS
<p>MG to 1.5 – 2.5m depth Alluvium 2.3 – 3.0m bgl Glacial 1.5 – 2.3m bgl</p> <p>Solvent odours noted.</p> <p>Elevated TCE in groundwater, methane up to 30% v/v, elevated Cu, Ni, Zn, phenols, As, B, Cd, and benzenes, toluoles and asbestos and chlorinated hydrocarbons in soils.</p> <p>Recommendations: Purge and clean all tanks, remove all asbestos, effluent lagoon to be cleared, pipework removed during demolition with caution, excavation of three contamination hotspots, remove all tanks, remove soils surrounding tanks, vapour extraction and groundwater removal and treatment by specialist remediation contractor.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	High (unless remedial recommendations can be confirmed)
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Geotechnical Site Investigation, Tameside Drive, Castle Bromwich		
SITE LOCATION:	Tameside Drive, Castle Bromwich (Site ref. 15)		
DATE PREPARED	March 2000	DATE REVIEWED	08/02/13
AUTHORED BY:	Knight Environmental Limited	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Geotechnical site investigation to assist in understanding foundation costs.			
SCOPE OF REPORT			
<p>Seven boreholes between 5.05 and 8.25m depth. Monitoring wells installed in four boreholes.</p> <p>Groundwater samples analysed for sulphate and pH.</p>			
CONCLUSIONS			
<p>Made Ground 0 to 2.5-3.4m depth Alluvium 2.5-3.4 to 4.4->6.1m depth (1.6 - >3.6m thick) Mercia Mudstone 4.4 - >6.1m depth (>3.8m thick)</p> <p>Groundwater level 3.3-3.5m bgl (from Alluvium) – in continuity with River Tame. Estimate flooding to raise GW by 2m.</p>			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		N/A	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Phase I Contamination Assessment, Tameside Drive, Castle Bromwich		
SITE LOCATION:	Tameside Drive, Castle Bromwich (Site ref. 15)		
DATE PREPARED	October 1999	DATE REVIEWED	08/02/13
AUTHORED BY:	Ground Solutions Group Limited	REVIEWED BY:	Land quality project team
REPORT CONTEXT			
Desk study and site walkover to assess potential for contaminated land at former double glazing factory prior to redevelopment.			
SCOPE OF REPORT			
Desk study and site walkover.			
CONCLUSIONS			
<p>Potential chemicals present identified included: oils and lubricants, paint, methylene chloride, detergents, adhesives and hardeners, cutting fluid, dibutyltin-maleate, dichloromethane, hydraulic fluid.</p> <p>Stains on floors suggest spillages may have occurred. No appropriate storage facilities were observed.</p> <p>Oily substance observed leaking from site into River Tame.</p> <p>Made ground beneath site likely to be producing methane and/or carbon dioxide.</p> <p>Further site investigation required. Likely to be classed as contaminated land.</p>			
POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE		High	

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Preliminary Site Investigation
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SITE LOCATION:	Former Regency International Plc site, Tameside Drive, Castle Bromwich (site ref. 15)
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DATE PREPARED	March 2000	DATE REVIEWED	08/02/13
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AUTHORED BY:	Knight Environmental	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
Preliminary phase II investigation to establish presence of contamination and geotechnical conditions prior to purchase by Space4 (current owners).

SCOPE OF REPORT
<p>11 probeholes to between 1.2 and 5.7m bgl, 7 boreholes to between 5.0 to 8.5m bgl, monitoring wells installed in 4 of the boreholes. Gas and groundwater monitoring.</p> <p>Soil samples tested for pH, heavy metals, inorganics, phenol, TPH, PAHs, asbestos, SVOCs, and VOCs. Leachability testing of heavy metals, pH, cyanide, PAH, sulphate, sulphide, phenols, and TPH. Groundwater samples tested for pH, conductivity, suspended solids, TDS, BOD, COD, ammoniacal nitrogen, heavy metals, cyanide, phenol, TPH, PAH, TOC, sulphide and sulphate.</p>

CONCLUSIONS
<p>Made Ground to 3.5m max. Alluvium 2.5 to 4.7m bgl Mercia Mudstone 4.7 to 8.5m bgl</p> <p>Groundwater level 3.3 to 3.6m bgl.</p> <p>Elevated As, Cu, Ni, Zn, sulphate, cyanide, TPH in soils. Elevated sulphate in groundwater. No significant leaching potential. No river contamination evident.</p> <p>No methane detected. CO2 3.9 – 5.3% v/v.</p> <p>Potential risk of contamination of the River Tame and perched groundwater is high therefore future site uses should including bunding etc of potential contaminants. Further gas monitoring should be undertaken.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Moderate.
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Application to Surrender Waste Management License at Jaguar Cars Ltd, Chester Road, Birmingham, B35 7RA
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SITE LOCATION:	Jaguar Land Rover Facility, Chester Road, Birmingham, B35 7RA
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DATE PREPARED	March 2003	DATE REVIEWED	04/04/13
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AUTHORED BY:	Golder Associates	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>Golder Associates commissioned to assist in Jaguar's application to surrender a Waste Management License in respect of the former Drypure paint sludge recycling plant at the Castel Bromwich Assembly Plant (Waste Management License No. SL971, issued by BCC). The report sets out the information required to support the application and enable the surrender of the WML.</p> <p>As part of the investigation, two boreholes (GA1 and GA2) were drilled at the NE elevation of 'W' Block (see Drawing on system) to depths of between 2.5 m and 3.0 m by Discovery Drilling using a pneumatic window sampler on 29th January 2003 to obtain samples (soil only, groundwater not encountered) for chemical analysis.</p>

SCOPE OF REPORT
Information required to support the application and enable the surrender of a Waste Management License in respect of the former Drypure paint sludge recycling plant at the Castel Bromwich Assembly Plant (Waste Management License No. SL971, issued by BCC).

CONCLUSIONS
<p>Golder undertook a site visit and made a visual inspection of the Drypure facility and its surrounds, reviewed documentation provided by Jaguar and undertaken a reconnaissance Site Investigation in areas of Potential Concern. The following conclusions were drawn:</p> <ol style="list-style-type: none"> 1. The interior areas (where the main process equipment remained at the time of writing) was observed to be tidy with no visible signs of any staining of the floor. The facility was also observed to be clear of deposited residues resulting from treatment of sludges and discarded waste materials. This part of the licensed facility appeared to be well managed. 2. The area of the former outdoor bund, which now forms part of 'W' Block, was also inspected. 3. The documentation reviewed appears to demonstrate that the facility was well operated from an environmental perspective. 4. Soil samples from the two boreholes were analysed for the presence of heavy metals, VOCs, glycol, cyanide compounds and hydrocarbons. The investigation work did not show contaminant concentrations above either the corresponding SGV or DIVs and as such, based on the results, no evidence was obtained to suggest any

land impacts in the Potential Areas of Concern investigated peripheral to 'W' Block. A qualitative risk assessment based on the assumption that Site operation will not change highlighted that elevated soil concentrations were not found during the investigation and no evidence was found to suggest that operation of the Drypure process has resulted in impacts to underlying soil.

5. No evidence was found to suggest that operation of the Drypure process has resulted in impacts to underlying soil, or the environment and does not pose a risk to human health.

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low (although only relates to a very localised area of overall Jaguar Facility)
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Geoenvironmental and Geotechnical Report on Ground Investigation at Fort Dunlop, Birmingham
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SITE LOCATION:	Fort Dunlop, Birmingham
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DATE PREPARED	December 2003	DATE REVIEWED	04/04/13
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AUTHORED BY:	Geotechnical Developments (UK) Ltd	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>The site was being considered for redevelopment by means of refurbishment of the interior of the building and extension of this building to include a six storey hotel (proposed to be piled) with associated underground services and limited landscaped areas. An underground and an above ground car park was also proposed. A desk study and GI was commissioned. It was noted that the site is known to have been subject to at least one previous GI (by Stranger Science & Environment in May 2000). It was also noted that it was understood that the area of rough grass land to the north of the building on the site has been subject to investigation and remediation in the past; this area was not investigated as part of this GI in terms of contamination but some limited geotechnical investigation was undertaken.</p>

SCOPE OF REPORT
Desk Study and Phase II GI

CONCLUSIONS
<p>Elevated concentrations of arsenic were detected, together with elevated concentrations of lead and selenium. Given that the end use of the site was proposed for partly residential and partly hotel/leisure facility, there is a possibility that end users may contact contaminated soils in landscaped areas. Nominal cover layers of inert soil are recommended in landscaped areas (minimum 300 mm). Risk to construction workers and surrounding properties was considered to be low and very low respectively based on the chemical results.</p> <p>The underlying river Terrace deposits are considered a minor aquifer and abstraction wells were noted in the vicinity understood to be solely for industrial use. Shallow groundwater and on site drainage are considered to represent viable pathways to the River Tame which is considered likely to represent the most sensitive environmental receptor. Based on the results collected, groundwater contamination at the site appears limited and so a low risk to nearby surface waters/groundwater quality is considered to be posed by the site. Full scale removal of all Made Ground on site would be probable to prevent possible leaching of metal/inorganic contamination to groundwater – this is considered unlikely to result in any discernible improvements water quality given the industrial use of the surrounding area; as such no specific remedial measures are considered to be warranted.</p> <p>Specific Water supply pipes may be required by Statutory Authorities to prevent tainting of water. Elevated concentrations of phytotoxic metals have been recorded in Made Ground soils across the site; given the concentrations, it is considered possible that some phytotoxic effects could be experienced and so it is recommended that some organic topsoil material should be placed in landscaped areas to reduce effects and enable plant</p>

establishments.

In addition to cover systems in landscaped areas, it was also recommended that all foundation and service excavations be inspected for visual/olfactory evidence of hydrocarbons, followed by removal and subsequent testing of surrounding soils. This will reduce the overall mass of such material which could possibly lead to ongoing migration.

Ground gas monitoring was undertaken on three occasions between 6th and 25th November 2003. Methane was not recorded in excess of equipment detection limits (<0.1%) Co2 ranged from 0.0% to 11.0%. Near atmospheric to highly depleted oxygen concentrations were recorded. A maximum flow of 18ml was recorded on the second visit in BH5 in the shallow standpipe. Low to no gas flow was recorded in the remaining holes. In accordance with the Building Regulations (1991) Approved Document C2, carbon dioxide is considered to pose a potential risk to the development across the whole site area and as such precautionary measures are considered necessary.

Note – Subsequent letter correspondence from Kevin Royal (Contaminated Land Team Leader at the Environmental Protection Unit BCC) dated 30th December 2003 stated that he would prefer all landscaped areas to be free from contamination to at least 500 mm to avoid any possible disturbance by subsequent maintenance and that no other objection is raised subject to this. Later separate letter correspondence from the EA (dated 21st April 2004) highlights that condition should not be discharged as the potential risk of contaminants of concern to Controlled Waters has not been addressed. This was forwarded back to Kevin Royal who responded by e-mail on 7th June 2004 to confirm that he stood by his original advice that human health exposure pathways could be dealt with by hardstanding an importation of clean soils to landscaped areas. He highlighted Geotechnical Developments' opinion that groundwater contamination is limited and contaminants within the ground are not impacting on groundwater. He noted that there seems little point running the figures through EA's RA model if the contaminants are not mobile and unlikely to impact on the groundwater or River Tame. No more correspondence available after this point.

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	'Site Investigation and Methane Monitoring Point Installation at Castle Bromwich Refuse Disposal Works – Factual Report [LF5]' and 'Interpretative Report for Castle Bromwich, Birmingham [LF5]'
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SITE LOCATION:	Castle Bromwich Refuse Disposal Works, Birmingham
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DATE PREPARED	March/October 1993	DATE REVIEWED	04/06/13
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AUTHORED BY:	Industrial Research Laboratories (IRL)	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>The investigation was requested by the Department of Environmental Services of BCC. The purpose was to provide information about ground conditions at the disused landfill site, in particular the depth of the deposited refuse. Also to install gas monitoring points in the centre of the landfilled area and around the perimeter to allow for gas assessment. It is noted that there exists an earlier desk study assessment, reference SI/92/051707A. The interpretative report notes that the site was identified from information obtained by a borehole survey carried out by the Hazardous Waste Unit in 1985; it also notes that the Environmental Protection Unit have carried out a limited bar probe survey at the site which indicated the presence of both methane and carbon dioxide in high concentrations in some areas.</p>

SCOPE OF REPORT
Factual and Interpretative Report on GI

CONCLUSIONS
<p>The thickness of Made Ground encountered across the site varied from 0.60 m in BH5 to 5.80 m in BH4. Other thicknesses as follows: BH1 = 4.80 m; BH2 = 5.00 m; BH3 = 5.50 m; BH6 = Abandoned; BH7 = 1.70 m; BH8 = 3.30 m; BH9 = 5.00 m; BH10 = 3.20 m; BH11 = 2.80 m; BH12 = 3.20 m; BH13 = 4.70 m; BH14 = 5.0 m; BH15 = 4.6 m. The fact such thickness were proven at the extremities of the site suggests that filling extended beyond the geographical boundaries of the site. The Made Ground generally consisted of dark brown, ashy, sandy clay with some brick, gravel and occasional paper, glass, wire, leather and timber. This Made Ground was underlain by a red-brown, silty clay with a decreasing gravel content to the depths bored. Groundwater was encountered in all holes except BH3 (which was damp from 4.50 m) with strikes being recorded between 4.2 m (BH11) to 6.40 m (BH5).</p> <p>The interpretative report notes how O₂ concentrations ranged from 0.01% to 21.0% suggesting both anaerobic and aerobic degradation to be possible. Maximum methane of 37.9% by volume was recorded in BH4 which recorded consistently high concentrations throughout the monitoring. Elsewhere results were somewhat spasmodic with BHs 3,8 and 9 showing frequent levels above the 1% trigger level advised by WMP27. High methane immediately north of the railway had been shown in previous investigation by the Urban Development Division of the City and three additional boreholes located in this 'anomalous hot-spot' confirmed this with values ranging from 10.1% to 45.3%. Similar patterns were recorded for CO₂, with consistently high readings in BH4 and a maximum on site of 16.3% in BH8. Beyond the railway, boreholes recorded levels between 12.6% to 20.9%. Groundwater levels during monitoring ranged from 2.49 m (BH11) to 4.93 (BH3).</p>

The high gas levels suggest generation in-situ although the hot-spot, which recorded higher concentrations for both gases, suggests migration could be occurring from that area, although it cannot be definitively considered the sole gas source (especially considering the potential for gas migration from the west as well given the suspected extension of Made Ground into that area). The levels on site suggest the factories to the west may be at risk and recommendations for internal monitoring and further investigation to the west (probably as far as Chester Road) were made. 4% CO2 was proven in the shower drains of the incinerator building and it was stated that this building would need to be carefully checked before being re-opened for any access purposes or use. Regular BH monitoring and some internal monitoring was recommended to be maintained. It was stated that sensible remedial measures could only be suggested after additional investigation results were available. Also noted possibility of leachate from the landfill polluting the River Tame and that this should be investigated but can only be done once the precise landfill limits have been clarified.

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE

Moderate

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Final Report Environmental Risk Assessment, Former Severn Trent Properties – Midpoint II, Minworth (Ref. No. 933385(4))
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SITE LOCATION:	Former Severn Trent Properties – Midpoint II, Minworth (Prologis)
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DATE PREPARED	April 2007	DATE REVIEWED	04/06/13
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AUTHORED BY:	Conestoga-Rovers & Associates (Europe) Ltd (CRA)	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
An Environmental Risk Assessment (EAR) including a detailed quantitative risk assessment (DQRA), prepared on behalf of ProLogis Developments Limited in respect of the former Severn Trent property sludge drying beds, Park Lane, Minworth. A Phase II SI undertaken by CRA in March 2007 is also summarised.

SCOPE OF REPORT
Environmental Risk Assessment (also summarises a Phase II SI undertaken by CRA).

CONCLUSIONS
<p>The ERA identified:</p> <ul style="list-style-type: none"> Shallow groundwater as a potential contaminant source (driven by unacceptable levels of copper, ammoniacal nitrogen, chloride, fluoride, nitrate, sulphate and TPH aromatic EC21-EC35); The sludge possesses a potential risk to human health (limited exceedances of lead, selected PAH and 2-methylnaphthalene) – either need to dispose off-site or, if deemed suitable for re-use on site, cover with hardstanding; and Ground gas concentrations (notably CO₂) potentially requiring remedial action. <p>The following relevant pollutant linkages were identified:</p> <ul style="list-style-type: none"> Off-site migration of shallow groundwater contaminants to the River Tame; The potential for dermal contact, soil or dust ingestion, dust and vapour inhalation of sludge contaminants by site occupants; and The potential for ground gas migration beneath the site buildings. <p>Remedial works recommended during redevelopment to minimise impact of shallow perched groundwater on the River Tame, confirmed by continued monitoring. If monitoring indicates continuing impact then emergency remedial measures should be initiated. Recommended that the chosen remedial option ideally should be in place prior to redevelopment. Need to provide short term protection during construction as well as post-redevelopment for the River Tame receptor. Periodic ground gas monitoring recommended in the vicinity of the building plateau once regrading of site is complete in order to demonstrate no unacceptable risk to future site users.</p>

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE	Low – Moderate
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HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	FINAL Risk-Based Remedial Strategy – ProLogis Park Minworth. File provide also includes various letter correspondence.
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SITE LOCATION:	Former Severn Trent Properties – Midpoint II, Minworth (Prologis)
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DATE PREPARED	13 June 2007 (also various preceding and subsequent correspondence)	DATE REVIEWED	04/06/13
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AUTHORED BY:	Conestoga-Rovers & Associates (Europe) Ltd (CRA)	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>CRA was retained by ProLogis Developments Limited to prepare a final risk-based remedial strategy to outline the remedial requirements for the proposed Midpoint II facility, located at the former Severn-Trent Properties sludge drying beds, adjacent to Water Orton Land, Minworth. The strategy addresses known and potentially unknown historical contamination present on the site, based on historical and recent CRA SI and risk assessment reports. The document notes how CRA completed a Phase II SI (March 2007) and a Preliminary Remedial Options Appraisal (PROA) in April 2007 that outlined possible remedial options for the site; these preceded the ERA report (April 2007) summarised in Report Review Reference No. 070.</p> <p>Various letter/e-mail/memo correspondence provide in the file – details given in conclusions section below.</p>

SCOPE OF REPORT
Risk-Based Remedial Strategy and various subsequent correspondence.

CONCLUSIONS
<p>The strategy discusses pre-construction groundwater/surface water sampling.</p> <p>The strategy then discusses the shallow groundwater contamination. It notes that the risk assessment has shown that site soils do not currently or in the future present a risk to controlled waters and that the attention of the remedial strategy is focussed on the existing impacted groundwater source beneath the site that represents a historical source. In accordance the strategy discusses the following:</p> <ul style="list-style-type: none"> • Construction phase ground water monitoring; • Construction phase environmental corridor monitoring; • Post-construction surficial and groundwater monitoring; • Protection measures of monitoring wells and surface water (e.g. discusses the installation of a silt fence along the bank of the River Tame extending approximately 100 m up the two sides of the site to intercept sediment-laden run-off); • Soil/groundwater treatment area; • Proposed groundwater remedy upgradient of the environmental corridor (proposed plan to address existing

groundwater source is to utilise a surface drainage box culvert structure as a barrier wall adjacent to the River Tame environmental corridor – figure 5);

- Proposed remedial activities within the environmental corridor;
- Proposed treatment/disposal of collected groundwaters (short-term = to existing Severn Trent wet well leading to foul sewer leading to Severn Trent water treatment works; long-term = discharge through the planned attenuation lagoon via a reed bed system; also incorporate phyto-remediation friendly plant species within the environmental corridor if suitable).

The strategy then discusses direct human health contact to sludges (intention to re-use once geotechnically stabilised) including:

- Proposed methodology for excavation/treatment of sewerage sludge material (may be in/ex-situ);
- Construction worker potential exposure pathway (to be addressed as part of the contractor Site Specific Working Plan);
- Future site worker potential exposure pathway (cement/lime stabilised sludges to be compacted/covered in hardstanding so pathway considered broken);
- Decontamination of equipment.

The strategy then discusses potential ground gas issues noting that an assessment will be undertaken once site re-grading has been completed. A number of boreholes will be advanced and installed (to max depth of 5 m below final regarded plateaux ground levels) beneath proposed building footprints.

Investigation/remediation of previously unknown soil/groundwater contamination (if encountered) is discussed.

Further detail is provided with regards to the site environmental watching brief, contractor site management, contractor environmental licensing, validation reporting of the remedial works and health and safety.

In terms of the additional letter correspondence, extra information is provided below as appropriate in chronological order:

- E-mail from Kevin Royal (BCC) to Jacky Rua (Planners at BCC) on 31st May 2007 saying he has no objection to discharge of conditions B9, B10, B12 and B13 and that subject to provision of validation report he has no objection to the proposed remediation strategy in relation to conditions B11 and B14. Comments relate specifically to human health as understood the EA are directly responding in terms of controlled waters;
- Confirmatory letter from planners to BCC on 13th and 18th June 2007;
- E-mail from Kevin Royal (BCC) to Planners sent confirming he has no objection to the discharge of the conditions relating to information received in relation to the site investigation conditions for Minworth (detailed in letter sent to Kevin from Jacky Rua (Planner) on 26th June 2007;
- Letter from CRA to Phil Fitzgerald (EA) sent 6th August 2007 detailing the identification of three unknown areas of contamination uncovered during the enabling works and remedial activities. A delineation exercise was undertaken in each case:
 - Petroleum based hydrocarbon contamination observed in a sludge main capping excavation relating to a surface water drain (including sludge main capping excavation and oil and water filled chamber);
 - AST;
 - Stockpile of high plastic sludges.
- Letter from CRA to Phil Fitzgerald (EA) sent 26th September 2007 regarding EA's site visit (21st August 2007) and also new borehole installations at the north border of the site, reduced monitoring of deep boreholes and details of the proposed decommissioning of current boreholes due to the construction of buildings on the site. The development of P20 remedial criteria for the groundwater within the environmental corridor was also discussed. The letter notes how CRA/BGCL seemingly co-operated with all the EA's observations and notably regarding the AST/UST and oil and water filled chamber, however, both cases were still to be completely closed out;
- Memo (memo3) sent by Dan Clowater/Jim Gott (CRA) to Phil Fitzgerald (EA) 4th October 2007 regarding derivation of groundwater remedial targets for the environmental corridor. It details the P20 assessment undertaken to establish the targets based on seven rounds of groundwater monitoring and 5 to 6 surface water monitoring points on the River Tame. The summary of the memo notes how a revised DQRA was carried out in consideration of Phil Fitzgerald of the EA's comments contained within the memo dated 28th August 2007, ref. WLDB 5476;
- Letter from CRA to Phil Fitzgerald (EA) sent 29th October 2007 as a follow-up to the two site visits made by EA representatives on 19th and 24th September 2007. Records the minutes of the meetings only and not the resulting actions. Talked about the oil and water filled chamber (Ea happy done everything possible and that the problem originates off-site), AST and box culvert;
- Memo (memo4) sent by Dan Clowater/Jo Berry (CRA) to Phil Fitzgerald (EA) 6th November 2007 regarding amended groundwater remedial targets for the environmental corridor following EA review. It was noted that the maximum concentrations of ammonia and zinc exceed the derived remedial targets;
- E-mail From Dan Clowater (CRA) to Phil Fitzgerald (EA) sent 7th November 2007 regarding the issue of the revised memo based on EA review for remedial targets for the area between the cut-off wall and River Tame;
- E-mail From Dan Clowater (CRA) to Vince O'Connell (Prologis) sent 26th November 2007 detailing alterations to the remedial targets memorandum for the area between the cut-off wall and River Tame based on EA review and further detail on monitoring outcomes;

- Letter from CRA to Buckingham Group Contracting Ltd (BGCL) (undertaking remediation works) sent 21st December 2007 to report findings of a ground gas assessment completed for the distribution warehouse Unit 2. Concluded that conditions have been assessed on four separate occasion over a one month period via advancement of four monitoring wells and that concentrations seem relatively consistent and importantly indicate no substantial flow. No methane recorded. CO₂ recorded almost always but GSV indicates 'very low risk'. Increased concentrations of CO recorded in all holes which exceeded long and short term exposure guidelines however the low and negative flow rates together with proposed building mitigation do not indicate significant risk. So overall no significant ground gas risk to future users within a commercial setting so CRA conclude that no further ground gas monitoring is required in the footprint of Unit 2 and that the outlined mitigation measures should be followed;
- Letter from CRA to Phil Fitzgerald (EA) sent 11th January 2008 to report information regarding groundwater analysis (changes to analysis suites for groundwater samples collected from environmental corridor with regards to derived remedial targets);
- Letter from CRA to Phil Fitzgerald (EA) sent 31st January 2008 detailing proposed changes to the groundwater monitoring schedule;
- Letter from CRA to Phil Fitzgerald (EA) sent 28th May 2008 detailing the analytical testing of water sampled from the cut-off wall collection chamber. Based on the results, CRA proposed to keep the membrane in place and continue pumping water into the foul sewer for the next 6 months when they will reassess (monitoring frequency will be reduced). Also proposed to reduce the analytical suite.

It can be noted from all the above detailed correspondence that CRA/BGCL worked very closely with the EA, however, due to the abrupt end in the records in the file (i.e. no official final sign off acceptance from the EA evident), risk cannot be discounted with complete certainty. However, based on the diligent audit trail evident in the file and apparent proactive nature of CRA/BGCL in relation to necessary remedial activity, it is likely that the site has been remediated to a suitable standard.

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE

Low

HS2 WEST MIDLANDS – LAND QUALITY REPORT REVIEW PRO FORMA

REPORT TITLE:	Geotechnical and Geoenvironmental Report, The NDC De-Pollution Plant, Birmingham (Report No.36785-001)
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SITE LOCATION:	The NDC De-Pollution Plant, Gravelly Hill Industrial Park, Birmingham
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DATE PREPARED	April 2009	DATE REVIEWED	17/09/13
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AUTHORED BY:	STATS Ground & Environment	REVIEWED BY:	Land quality project team
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REPORT CONTEXT
<p>On the instructions of Cundall Johnston & Partners LLP, STATS Ground & Environment (STATS) carried out a Phase II Geotechnical Report and Soil Waste Classification investigation of The NDC De-pollution Plant located within Gravelly Hill Industrial Park in Birmingham.</p> <p>The project was commissioned in order to identify the potential for hazardous substances or conditions to exist on, at or near the site and therefore, via the development of a Conceptual Site Model (CSM), identify the necessity for and extent of mitigation measures to be employed in relation to the proposed industrial development of a 'de-pollution plant' on the site with associated hardstanding. The work undertaken included desk study and site investigation.</p> <p>The site comprises a disused 'Emergency Training Village' located in the southwestern corner of a larger National Grid distribution site. Permanent and temporary buildings and gas fitting furniture are present on site associated with the training of gas workers; the surrounding National Grid site is used for the purposes of storage and distribution of gas pipes. The River Tame flows in a straightened channel immediately to the south of the site.</p> <p>A Factual Environmental Site Investigation (July, 1997) was prepared by Parkman (ref: 17612/OR/4); the full report is not available but a review is provided. Parkman's desk study comprises a review of three ground investigation reports dated from between 1991 and 1994 and reports on additional gap-filling investigation undertaken by themselves for the wider National Grid site area as a whole. The review noted that previous development in 1993 resulted in 0.75 m below ground level (bgl) (~ 1500m³) of material being disposed off site as contaminated, whilst the development of the car park adjacent north of the Emergency Training Village site area in 1996 resulted in 0.23 m bgl of material also deeply contaminated being partially disposed of off site (some remained on site in two landscaped mounds). The Parkman (1997) report indicated there to be between 2.50 m and 3.00 m of Made Ground underlain by fluvioglacial deposits, in turn underlain by Mercia Mudstone.</p> <p>Site work was undertaken between 16th to 18th February and on the 12th March 2009 and comprised on 3 No. cable percussive boreholes, 4 No. trial pits and 5 No. windowless sampler boreholes. 7 standpipe/monitoring installations were constructed and PID screening of samples undertaken. Ground gas/groundwater monitoring was undertaken by means of four return visits with 1 visit being to obtain water samples. Geotechnical and chemical testing was carried out.</p>

SCOPE OF REPORT
Geotechnical and Geoenvironmental Report

CONCLUSIONS

Generally, Made Ground was encountered to a maximum depth of 4.90 m bgl, over alluvium and river terrace deposits in turn over Mercia Mudstone deposits with the latter being encountered from depths of 7.00 m bgl. Groundwater was monitored 1.70 m bgl (Made Ground) to 3.51 m bgl (river terrace deposits). At the time of writing, no methane had been detected but up to 7.8% CO₂ and minimum O₂ of 8.4% had been recorded (gas flow rates of up to 0.2 l/hr were detected).

With regards to human health, the investigation did not indicate the presence of contamination that is a potential risk to industrial/commercial end users. Construction workers are not included within chronic human health risk assessments but can be protected during and after development through H&S procedures.

Whilst exceedances of ammoniacal nitrogen and ammonia were identified within groundwater, this was considered to be indicative of a wider local groundwater issue not attributable to the site. Given the presence of low permeability alluvium across the majority of the site and leachate/groundwater results indicating potentially leachable concentrations in Made Ground are not impacting groundwater with the river terrace deposits, a significant pollutant pathway is not considered present between the site and controlled waters. A localised limited pathway is noted in the west where alluvium is absent but given the absence of any significant exceedances within groundwater attributable to the site, this pathway is not considered significant.

Ground gas monitoring indicated that the site can be characterised as Characteristic Situation 2 due to elevated CO₂ > 5% which requires gas protection measures. The site is indicated to fall within an area for which no radon protection is required.

The investigation has not indicated there to be a pollutant linkage in regards to contamination and building materials providing the appropriate BRE SD1 classification is referred to (i.e. DS-3 AC-3) – the presence of ammonium should also be noted in concrete selection.

Based on the nature of the ground conditions, piles are considered to be the most suitable foundation solution, although ground improvement is an option to facilitate a shallow solution.

Note: The file includes e-mail correspondence between Paul Burns (BCC EPO) and Jim Allen dated April 2009 in which Paul acknowledges receipt of the site investigation report and upon review, asks for clarification (preferably a drawing) in respect of the recommended gas protection measures in the context of the foundation design. Paul notes that everything else seems in order. Jim replied to set out the measures in accordance with CS2 (cast in situ reinforced concrete floor slab and 2000g DPM with no underfloor void); he added that this is a very conservative approach given the site only just falls within CS2 and based on peak CO₂ concentrations rather than steady state concentrations normally used to determine CO₂ risk (all steady state concentrations were <5%).

POTENTIAL FOR LAND QUALITY ISSUES AT THE SITE

Low (but note that gas/concrete protection measures required)

GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	Prologis Park, Birmingham, B769EH
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PROJECT REFERENCE:	47062728	DATE:	04/09/2012
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PREPARED BY:	Land quality project team	NGR:	-
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WEATHER:	Overcast; slight breeze; dry
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OVERVIEW SITE DESCRIPTION
<p>Access from public highway only – no detailed inspection</p> <p>Noted to be a small industrial estate – not heavy industry, including:</p> <ul style="list-style-type: none">- Europa Worldwide Logistics- TPN (pallet distribution)- Kuehne & Nagal (pharmaceuticals distribution) <p>Also noted were access roads (tarmac), landscaped verges and occasional undeveloped plots.</p> <p>Pond in the middle of the site with evidence of excavated/tipped soil.</p> <p>1) Provide an generalised description of the site and main activity</p>

TOPOGRAPHY
<p>Generally level except around pond and raised planting beds.</p> <p>Materials in soil mounds most likely to be stockpiled from past and current construction activity</p> <p>1) <i>Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.</i></p> <p>2) <i>Look for evidence of Made Ground</i></p> <p>3) <i>Look for evidence of fly tipping</i></p> <p>4) <i>Gradient</i></p> <p>5) <i>Estimate percentage vegetation cover</i></p>

SOIL QUALITY
<p>N/A – not possible to ascertain from the public highway</p> <p><i>If exposed/present describe soil distribution and key characteristics including:</i></p> <p>1) <i>the presence of any odours;</i></p> <p>2) <i>coloured or oily deposits on the soil surface;</i></p> <p>3) <i>litter build up on soil surface;</i></p> <p>4) <i>absence of worm casts unless soil is naturally acidic;</i></p> <p>5) <i>soil structure etc.</i></p>

SITE DRAINAGE

Apparent dedicated surface and foul drainage network

- 1) Describe observations of any standing water or poor drainage
- 2) Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity

WATER QUALITY

Pond not inspected due to limitations of the survey.

- 1) Assess the quality of any standing or running water either on site, or running to from the site.
- 2) In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.

VEGETATION COVER

Partially well managed and kept

Rough and unmanaged on undeveloped plots

Trees appear young suggesting recent planting.

- 1) Describe distribution and note presence and absence across the site.
- 2) Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity
- 3) Mature trees indicate site may have been undisturbed for some time.
- 4) Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?
- 5) Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:
 - a) Look for visible signs of plant distress or discolouration, poor root and nodule development.
 - b) Do trees appear stunted or diseased?
 - c) Are there areas of poorly vegetated or bare patches of ground?
 - d) Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?
 - e) Are there any indicator species e.g. metal tolerant species?

ECOLOGICAL ISSUES (OUTLINE)

No obvious concerns but with the pond and vegetation some ecological interest is possible. No detailed appraisal as beyond the scope of the visit.

- 1) Not intended to replace a formal ecological assessment but to highlight any standout potential constraints
- 2) Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.
- 3) Is there any evidence of fauna e.g. burrows, droppings, animal prints?
- 4) Evidence of bat roost potential e.g. open roof spaces
- 5) Presence of knotweed or invasive species?

BUILDINGS AND LARGE INFRASTRUCTURE

Collection of large warehouses/distribution centre type buildings
Portal frame with steel cladding

3 main buildings and a depot – see pg 1 for description

Occasional apparent substation boxes off road notably the frontage to Europa on entrance to park.

- 1) Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.
- 2) Only enter a building if safe to do so.
- 3) Consider the potential for the building to be listed or to have historic value
- 4) Note any evidence or indicators that contamination may have taken place

ANCILLIARY INFRASTRUCTURE

None noted but access restricted

Possible drainage tanks/attenuation tanks near access to K & N site.

- 1) Are there any above or below ground bulk fuel or chemical storage tanks?
- 2) Are there any above or below ground pipe work used to convey chemicals or fuels?
- 3) Any evidence of spillage/leakage?
- 4) Comment on integrity of storage facilities?
- 5) Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?
- 6) Are spill kits apparent?
- 7) Any substations and is the date of installation known. Pre 1986 may contain PCB.
- 8) Any other raw material storage areas, treatment or process areas?

SITE OPERATION (PAST AND PRESENT)

See previous notes

- 1) Describe specific process lines and operations on site?
- 2) Are there any established/accredited process, environmental management, waste management systems/protocols in place?
- 3) Are there any residual indicators of a site's past use e.g. old fences/gates, floor slabs, old tanks?
- 4) Any evidence of the site ever being involved in military activities.
- 5) Any discharge consents/abstraction licenses?
- 6) Any process controls e.g. LAPPC, IPPC

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION

Some excavated material present around pond

No evidence of contaminated land

- 1) State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials
- 2) Consider old buildings and relic storage/process areas.

SURROUNDING LAND USE	
NORTH	Midpoint Park
NORTHEAST	
EAST	Sewage Works
SOUTH EAST	
SOUTH	Open space with M6 and Castle Bromwich beyond
SOUTHWEST	
WEST	Castle Vale Enterprise Park/open land/reservoir. Historical landfill (Farnborough) and current public open space Railway on embankment adjacent
NORTHWEST	
GENERAL	
1) Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination. 2) Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)	

MISCELLANEOUS COMMENTS/NOTES

GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	Public open space in area of historic landfill
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PROJECT REFERENCE:	47062728	DATE:	04/09/2012
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PREPARED BY:	Land quality project team	NGR:	-
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WEATHER:	Overcast; dry; slight breeze.
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OVERVIEW SITE DESCRIPTION
Public open space/allotment gardens. POS is signed as the "Castle Vale Conservation Area". Site inspection was undertaken from the public highway/access points. Discretion was therefore applied.
1) Provide an generalised description of the site and main activity

TOPOGRAPHY
Appears relatively level.
Approximately 90% landscaping/10% hard standing /building. Hard standing is mainly access roads to the allotments and footpaths. A new build development noted in the north,
1) Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.
2) Look for evidence of Made Ground
3) Look for evidence of fly tipping
4) Gradient
5) Estimate percentage vegetation cover

SOIL QUALITY
Not really exposed. Dense cover of unmanaged grassland across POS. Littering noted e.g. plastic bags.
If exposed/present describe soil distribution and key characteristics including:
1) the presence of any odours;
2) coloured or oily deposits on the soil surface;
3) litter build up on soil surface;
4) absence of worm casts unless soil is naturally acidic;
5) soil structure etc.

SITE DRAINAGE

No dedicated surface drainage network noted. No significant ponding.

- 1) *Describe observations of any standing water or poor drainage*
- 2) *Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity*

WATER QUALITY

N/A

- 1) *Assess the quality of any standing or running water either on site, or running to from the site.*
- 2) *In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.*

VEGETATION COVER

Various semi-mature and mature bushes and trees – generally healthy in appearance and well maintained. At ground level grasses appear wild in nature, unhealthy and overgrown (approx. knee height)

- 1) *Describe distribution and note presence and absence across the site.*
- 2) *Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity*
- 3) *Mature trees indicate site may have been undisturbed for some time.*
- 4) *Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?*
- 5) *Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:*
 - a) *Look for visible signs of plant distress or discolouration, poor root and nodule development.*
 - b) *Do trees appear stunted or diseased?*
 - c) *Are there areas of poorly vegetated or bare patches of ground?*
 - d) *Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?*
 - e) *Are there any indicator species e.g. metal tolerant species?*

ECOLOGICAL ISSUES (OUTLINE)

Potential for ecological issues, numerous hedgerows. No detailed assessment undertaken at this time.

- 1) *Not intended to replace a formal ecological assessment but to highlight any standout potential constraints*
- 2) *Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.*
- 3) *Is there any evidence of fauna e.g. burrows, droppings, animal prints?*
- 4) *Evidence of bat roost potential e.g. open roof spaces*
- 5) *Presence of knotweed or invasive species?*

BUILDINGS AND LARGE INFRASTRUCTURE

3 storey brick built flats/apartment block in the north with a slight pitched roof. No other large infrastructure present.

- 1) Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.
- 2) Only enter a building if safe to do so.
- 3) Consider the potential for the building to be listed or to have historic value
- 4) Note any evidence or indicators that contamination may have taken place

ANCILLIARY INFRASTRUCTURE

Gates / access tracks to allotments and into the POS/area of historical landfill.

Four gas vents (approx. 4 m high and 0.2 m dia) noted near the entrance to the allotments/landfill area. All but one was missing cowls. Also other vents noted along western edge of landfill and also in east (the majority that could be seen were missing cowls. No evidence of vents along southern boundary (closest to HS2) but here the vegetation was very dense and any stacks could easily be concealed.

- 1) Are there any above or below ground bulk fuel or chemical storage tanks?
- 2) Are there any above or below ground pipe work used to convey chemicals or fuels?
- 3) Any evidence of spillage/leakage?
- 4) Comment on integrity of storage facilities?
- 5) Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?
- 6) Are spill kits apparent?
- 7) Any substations and is the date of installation known. Pre 1986 may contain PCB.
- 8) Any other raw material storage areas, treatment or process areas?

SITE OPERATION (PAST AND PRESENT)

Historical landfill. Currently POS under authority of BCC and identified by signage as the 'Castle Vale Conservation Area'

Private allotments in the northern half.

- 1) Describe specific process lines and operations on site?
- 2) Are there any established/accredited process, environmental management, waste management systems/protocols in place?
- 3) Are there any residual indicators of a site's past use e.g. old fences/gates, floor slabs, old tanks?
- 4) Any evidence of the site ever being involved in military activities.
- 5) Any discharge consents/abstraction licenses?
- 6) Any process controls e.g. LAPPC, IPPC

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION


N/A except for evidence of a landfill.

- 1) State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials
- 2) Consider old buildings and relic storage/process areas.

SURROUNDING LAND USE

NORTH	Castle Vale Enterprise Park
NORTHEAST	
EAST	Open undeveloped land; Europa Business Park beyond

SURROUNDING LAND USE	
SOUTH EAST	
SOUTH	Open undeveloped land with railway beyond
SOUTHWEST	
WEST	Playing fields / Vale Stadium (Football Ground)
NORTHWEST	
GENERAL	
1)	Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination.
2)	Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)

MISCELLANEOUS COMMENTS/NOTES


GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	Ballast Phoenix (Castle Bromwich Waste Treatment Site)
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PROJECT REFERENCE:	47062728	DATE:	24/05/2013
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PREPARED BY:	Land quality project team	NGR:	-
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WEATHER:	Overcast; windy
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OVERVIEW SITE DESCRIPTION
<p>Escorted visit.</p> <p>Site is licensed for the recovery of bottom ash from the incinerator in Small Heath. BCC own the site, leased to Ballast Phoenix and Veolia next door for civic waste disposal.</p> <p>Metal recovered from ash. Ash is received and left to dry for 4 weeks before recovery operation started. Dust is separated and taken off site.</p> <p>New balancing lagoon present in HS2's footprint.</p> <p>1) Provide an generalised description of the site and main activity</p>

TOPOGRAPHY
<p>Generally flat with limited vegetation except on the periphery of the site. Large industrial looking building in the north. Building not used except for plant storage on ground floor. Building has been out of operation for some time.</p> <p>Within ground floor there is a catchment drain/sump to collect surface water drainage/runoff from areas south of the building. Drainage ditch collect drainage in the north of the site (north of the building) and runs to the pond. Balancing pond collects overflow. All discharge to foul.</p> <p>1) <i>Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.</i></p> <p>2) <i>Look for evidence of Made Ground</i></p> <p>3) <i>Look for evidence of fly tipping</i></p> <p>4) <i>Gradient</i></p> <p>5) <i>Estimate percentage vegetation cover</i></p>

SOIL QUALITY

Majority of site is covered in bottom ash dust/stockpiles

Made ground expected across this site due to sites former use as a landfill.

If exposed/present describe soil distribution and key characteristics including:

- 1) *the presence of any odours;*
- 2) *coloured or oily deposits on the soil surface;*
- 3) *litter build up on soil surface;*
- 4) *absence of worm casts unless soil is naturally acidic;*
- 5) *soil structure etc.*

SITE DRAINAGE

See cover notes

- 1) *Describe observations of any standing water or poor drainage*
- 2) *Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity*

WATER QUALITY

Some surface water as follows:

- Ponding due to uneven surfaces with water added through dust controls
- Balancing pond

Standing water contains bottom ash.

- 1) *Assess the quality of any standing or running water either on site, or running to from the site.*
- 2) *In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.*

VEGETATION COVER

Limited to site boundaries, generally unmanaged

- 1) *Describe distribution and note presence and absence across the site.*
- 2) *Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity*
- 3) *Mature trees indicate site may have been undisturbed for some time.*
- 4) *Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?*
- 5) *Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:*
 - a) *Look for visible signs of plant distress or discolouration, poor root and nodule development.*
 - b) *Do trees appear stunted or diseased?*
 - c) *Are there areas of poorly vegetated or bare patches of ground?*
 - d) *Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?*
 - e) *Are there any indicator species e.g. metal tolerant species?*

ECOLOGICAL ISSUES (OUTLINE)

Not assessed as beyond scope of the walkover

- 1) *Not intended to replace a formal ecological assessment but to highlight any standout potential constraints*
- 2) *Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.*
- 3) *Is there any evidence of fauna e.g. burrows, droppings, animal prints?*
- 4) *Evidence of bat roost potential e.g. open roof spaces*
- 5) *Presence of knotweed or invasive species?*

BUILDINGS AND LARGE INFRASTRUCTURE

Weighbridge – single storey with flat roof

2,300 litre double skinned red diesel tank

Derelict approximately 15 m high building thought to have historically been used for waste recovery and suspected to have been part of the former landfill operations. Currently only used for plat storage. There is a concrete ramp up to the building which has open sides (the open sides may be to allow venting of gas as ground gas has been known to be an issue on this site)

No visible or obvious gas venting/landfill mitigation and guide not aware of any.

Perimeter road appears newly constructed

Balancing pond fenced off in north eastern corner. Constructed 18 months ago.

Substation – relocated and rebuilt 18 months previously.

- 1) *Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.*
- 2) *Only enter a building if safe to do so.*
- 3) *Consider the potential for the building to be listed or to have historic value*
- 4) *Note any evidence or indicators that contamination may have taken place*

ANCILLIARY INFRASTRUCTURE

Substation (18 months old) on western boundary

Dust suppression spray along perimeter road

Red diesel tank

- No significant evidence of spillage but fuel lines and refuelling noted to take place on unprotected ground. Some drip/spill possible here.
- No spill kits noted/apparent
- Some waste recovery bays apparent e.g. for plastic and metal

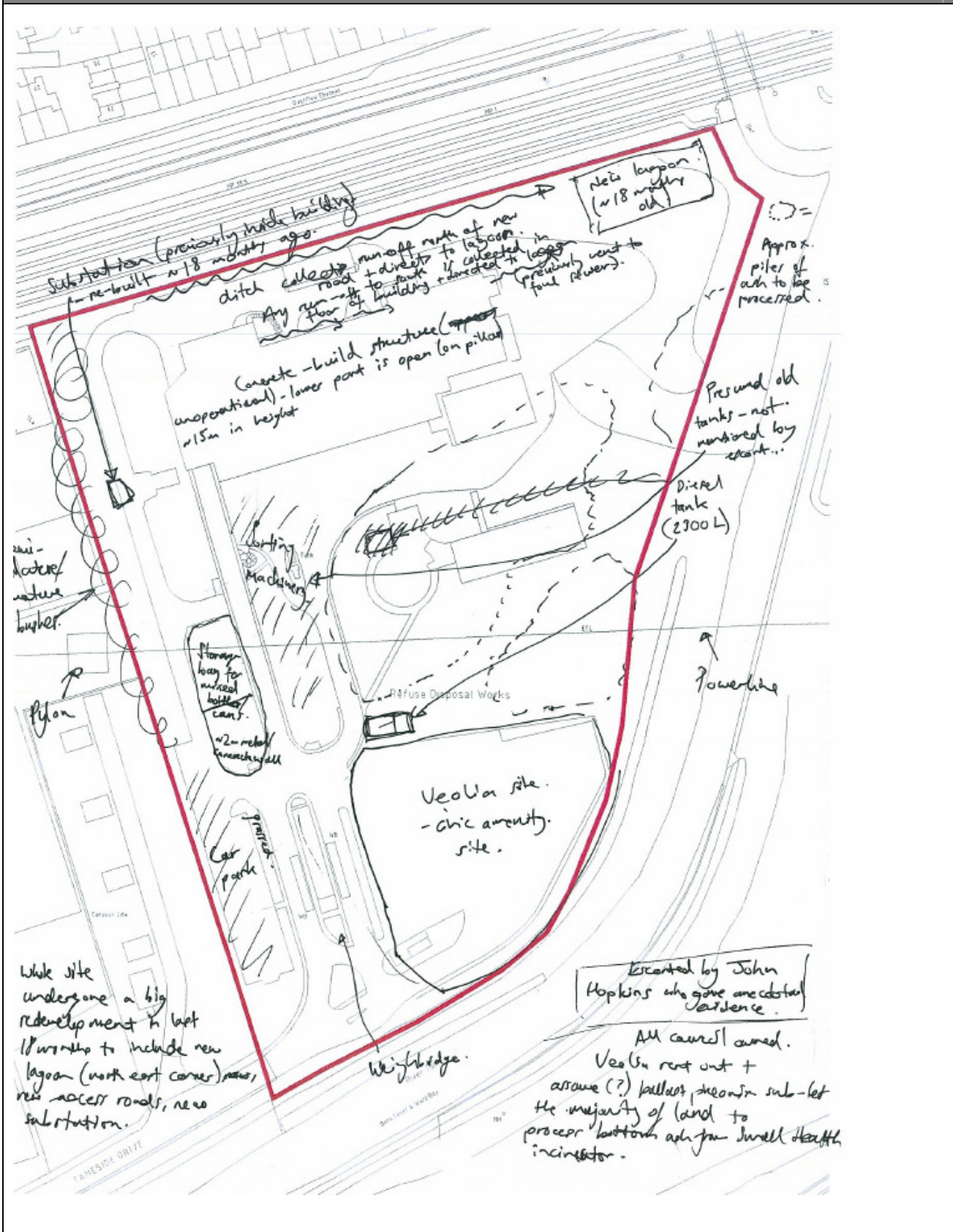
- 1) *Are there any above or below ground bulk fuel or chemical storage tanks?*
- 2) *Are there any above or below ground pipe work used to convey chemicals or fuels?*
- 3) *Any evidence of spillage/leakage?*
- 4) *Comment on integrity of storage facilities?*
- 5) *Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?*
- 6) *Are spill kits apparent?*
- 7) *Any substations and is the date of installation known. Pre 1986 may contain PCB.*
- 8) *Any other raw material storage areas, treatment or process areas?*

SITE OPERATION (PAST AND PRESENT)	
Bottom Ash processing and metal recovery – see other notes	
1)	<i>Describe specific process lines and operations on site?</i>
2)	<i>Are there any established/accredited process, environmental management, waste management systems/protocols in place?</i>
3)	<i>Are there any residual indicators of a sites past use e.g. old fences/gates , floor slabs, old tanks?</i>
4)	<i>Any evidence of the site ever being involved in military activities.</i>
5)	<i>Any discharge consents/abstraction licenses?</i>
6)	<i>Any process controls e.g. LAPP, IPPC</i>

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION	
No pollution incidents according to site escort	
See other notes regarding tanks and refuelling and absence of gas mitigation	
1)	<i>State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials</i>
2)	<i>Consider old buildings and relic storage/process areas.</i>

SURROUNDING LAND USE	
NORTH	Derby to Birmingham railway line and residential
NORTHEAST	As above
EAST	Park Hall NR
SOUTH EAST	Park Hall NR and M6
SOUTH	River Tame / M6
SOUTHWEST	River Tame / M6
WEST	Industrial Estate
NORTHWEST	Railway and residential
GENERAL	
1)	<i>Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination.</i>
2)	<i>Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)</i>

MISCELLANEOUS COMMENTS/NOTES





Photograph 1 - Red Diesel Tank



Photograph 2 - Ash Stockpiles



Photograph 3 - Ash Stockpiles



Photograph 4 - Drainage Sump



Photograph 5 - North West Corner



Photograph 6 - North Perimeter Rd



Photograph 7 - North Perimeter Rd



Photograph 8 - Ramp to building



Photograph 9 - Red Diesel Tank



Photograph 10 - Settlement Pond



Photograph 11 - View to Park Hall NR

GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	Castle Bromwich Business Park, B35 6DQ
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PROJECT REFERENCE:	47062728	DATE:	04/09/2012
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PREPARED BY:	Land quality project team	NGR:	-
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WEATHER:	Overcast; slight breeze.
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OVERVIEW SITE DESCRIPTION
Castle Bromwich Business Park. Site visit was from public highway only and so only general observations were possible. Photos were not taken.
1) Provide an generalised description of the site and main activity

TOPOGRAPHY
Level.
Approximately 95% hard standing cover with 5% landscaping e.g. grassed verges.
1) Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.
2) Look for evidence of Made Ground
3) Look for evidence of fly tipping
4) Gradient
5) Estimate percentage vegetation cover

SOIL QUALITY
N/A – not possible to ascertain from public highway.
If exposed/present describe soil distribution and key characteristics including: 1) the presence of any odours; 2) coloured or oily deposits on the soil surface; 3) litter build up on soil surface; 4) absence of worm casts unless soil is naturally acidic; 5) soil structure etc.

SITE DRAINAGE

Surface water drainage network noted. No evidence of significant surface water ponding but dry at time of inspection.

- 1) *Describe observations of any standing water or poor drainage*
- 2) *Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity*

WATER QUALITY

N/A – not possible to ascertain from public highway.

- 1) *Assess the quality of any standing or running water either on site, or running to from the site.*
- 2) *In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.*

VEGETATION COVER

Semi-mature/mature vegetation, healthy in appearance and well maintained. Trees and bushes confined to boundaries and areas of landscaping.

- 1) *Describe distribution and note presence and absence across the site.*
- 2) *Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity*
- 3) *Mature trees indicate site may have been undisturbed for some time.*
- 4) *Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?*
- 5) *Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:*
 - a) *Look for visible signs of plant distress or discolouration, poor root and nodule development.*
 - b) *Do trees appear stunted or diseased?*
 - c) *Are there areas of poorly vegetated or bare patches of ground?*
 - d) *Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?*
 - e) *Are there any indicator species e.g. metal tolerant species?*

ECOLOGICAL ISSUES (OUTLINE)

River Tame (south adjacent) – beneath M6

- 1) *Not intended to replace a formal ecological assessment but to highlight any standout potential constraints*
- 2) *Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.*
- 3) *Is there any evidence of fauna e.g. burrows, droppings, animal prints?*
- 4) *Evidence of bat roost potential e.g. open roof spaces*
- 5) *Presence of knotweed or invasive species?*

BUILDINGS AND LARGE INFRASTRUCTURE

Several brick built one-storey units

- 1) Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.
- 2) Only enter a building if safe to do so.
- 3) Consider the potential for the building to be listed or to have historic value
- 4) Note any evidence or indicators that contamination may have taken place

ANCILLIARY INFRASTRUCTURE

Boundary gates

- 1) Are there any above or below ground bulk fuel or chemical storage tanks?
- 2) Are there any above or below ground pipe work used to convey chemicals or fuels?
- 3) Any evidence of spillage/leakage?
- 4) Comment on integrity of storage facilities?
- 5) Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?
- 6) Are spill kits apparent?
- 7) Any substations and is the date of installation known. Pre 1986 may contain PCB.
- 8) Any other raw material storage areas, treatment or process areas?

SITE OPERATION (PAST AND PRESENT)

Business Park (see photos)

- Guhring (precision cutting tools)
- Consignia (Royal Mail) – Castle Bromwich delivery offices

Historic landfill to east

- 1) Describe specific process lines and operations on site?
- 2) Are there any established/accredited process, environmental management, waste management systems/protocols in place?
- 3) Are there any residual indicators of a site's past use e.g. old fences/gates, floor slabs, old tanks?
- 4) Any evidence of the site ever being involved in military activities.
- 5) Any discharge consents/abstraction licenses?
- 6) Any process controls e.g. LAPPC, IPPC

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION

N/A

- 1) State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials
- 2) Consider old buildings and relic storage/process areas.

SURROUNDING LAND USE

NORTH

Railway adjacent with residential beyond

SURROUNDING LAND USE	
NORTHEAST	
EAST	Industrial - various
SOUTH EAST	
SOUTH	River Tame (M6 on viaduct)
SOUTHWEST	
WEST	Industrial/commercial. Fort Industrial Park
NORTHWEST	
GENERAL	
1) Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination. 2) Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)	

MISCELLANEOUS COMMENTS/NOTES	
<p>The image shows a hand-drawn map of an urban area with various annotations. At the top left, it says 'no problem'. In the upper middle, 'include when (electric planning)' is written. To the right, 'new build - 3 storey brick build. blocks' is noted. A large red dashed line runs horizontally across the middle. Below this line, 'Veolia' is written with an arrow pointing to a specific location. Other annotations include 'cycle lanes', 'worry place', and 'grey area'. The map itself shows streets, buildings, and some green spaces.</p>	

GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	The Fort Industrial Park, Birmingham, B35 7AR
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PROJECT REFERENCE:	47062728	DATE:	06/07/2012
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PREPARED BY:	Land quality project team	NGR:	
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WEATHER:	Moderate/heavy rain; overcast; 8/8 cloud cover.
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OVERVIEW SITE DESCRIPTION
<p>The site is occupied by an active industrial estate. The site area is approximately 300 m by 200 m in size and rectangular in shape. The southern and western boundaries are represented by a steel fence approximately 3 m in height. The site is located approximately 50 – 60 m north of the proposed HS2 alignment. A site layout plan for reference in conjunction with this proforma can be found attached.</p>
1) Provide a generalised description of the site and main activity

TOPOGRAPHY
<p>Relatively level.</p> <p>Approximately 90% hardstanding/building cover and 10% unprotected ground with the latter generally represented by localised areas of landscaping/planting and vegetation cover at the edges of buildings and around the perimeter of the site. Dunlop Way and the main access road through the centre of the site are comprised of average/good quality tarmac, whilst the hardstanding at the frontages to the industrial units is comprised of average/good quality concrete.</p> <p>Wood chipping/gravel pebble surface cover noted at the south east boundary, together with what appears to be an old concrete footing approximately 6 m by 6 m in size.</p> <p>No evidence of exposed Made Ground in cut or fly tipping although several areas of discarded material – generally appropriately stored in skips/containers (notably south west corner and near doorways to units).</p>
<p>1) Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.</p> <p>2) Look for evidence of Made Ground</p> <p>3) Look for evidence of fly tipping</p> <p>4) Gradient</p> <p>5) Estimate percentage vegetation cover</p>

SOIL QUALITY

Where exposed, topsoil appears clean brown slightly sandy slightly gravelly clay. Occasional litter (e.g. plastic bag, paper)

If exposed/present describe soil distribution and key characteristics including:

- 1) *the presence of any odours;*
- 2) *coloured or oily deposits on the soil surface;*
- 3) *litter build up on soil surface;*
- 4) *absence of worm casts unless soil is naturally acidic;*
- 5) *soil structure etc.*

SITE DRAINAGE

Numerous surface water drains around the site (look well maintained and of good integrity). However moderate/heavy rain on the day of the survey highlighted several areas site-wide prone to localised surface water ponding in ground level depressions.

- 1) *Describe observations of any standing water or poor drainage*
- 2) *Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity*

WATER QUALITY

No signs of contamination noted.

- 1) *Assess the quality of any standing or running water either on site, or running to from the site.*
- 2) *In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.*

VEGETATION COVER

Vegetation cover is generally represented by localised areas of landscaping/planting at the edges of buildings and around the perimeter of the site. It was noted to be in a well-maintained and healthy condition in all areas of the site and consisted of a mixture of semi-mature/mature bushes and plants, with an area of grass in the south west corner. Semi-mature/mature trees are present (frequently along the southern and western boundaries).

- 1) *Describe distribution and note presence and absence across the site.*
- 2) *Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity*
- 3) *Mature trees indicate site may have been undisturbed for some time.*
- 4) *Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?*
- 5) *Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:*
 - a) *Look for visible signs of plant distress or discolouration, poor root and nodule development.*
 - b) *Do trees appear stunted or diseased?*
 - c) *Are there areas of poorly vegetated or bare patches of ground?*
 - d) *Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?*
 - e) *Are there any indicator species e.g. metal tolerant species?*

ECOLOGICAL ISSUES (OUTLINE)

None noted.

- 1) *Not intended to replace a formal ecological assessment but to highlight any standout potential constraints*
- 2) *Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.*
- 3) *Is there any evidence of fauna e.g. burrows, droppings, animal prints?*
- 4) *Evidence of bat roost potential e.g. open roof spaces*
- 5) *Presence of knotweed or invasive species?*

BUILDINGS AND LARGE INFRASTRUCTURE

Numerous industrial units although many seemed shut and not in use (this seemed to be supported by the unit location signpost near the entrance of the site (Photo 3) which indicated many vacant units as well as several 'To Let' signs noted around the site). Photo 3 may be corresponded with the map of the site to show which industries operate at the site.

Severn Trent Water Sewerage Pumping Station near the central southern boundary (approximately 5 m by 10 m; single storey, brick-build).

- 1) *Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.*
- 2) *Only enter a building if safe to do so.*
- 3) *Consider the potential for the building to be listed or to have historic value*
- 4) *Note any evidence or indicators that contamination may have taken place*

ANCILLIARY INFRASTRUCTURE

Floodlights/lampposts.

Two electricity sub-stations – one near the entrance to the site; the other off-site adjacent to the north eastern boundary (both one storey; brick-build/brick-surround).

Sub-station (?) at south west corner – appears to have various oil/electrical tanks/containers – 'Oiline' lubricants storage containers (~ 6 or 7). Skips contain various industrial materials. In the south west corner, skips contain various spent rubber, piping; Barrel of 'Oiline' lubricant

Several gas canisters (Calour Gas and Flogas) noted around the site (particularly in the south east corner (3 or 4) and near the north west corner (~10).

Pipes associated with the STW sewerage Pumping Station; also a borehole (?) flush cover at the north west entrance.

- 1) *Are there any above or below ground bulk fuel or chemical storage tanks?*
- 2) *Are there any above or below ground pipe work used to convey chemicals or fuels?*
- 3) *Any evidence of spillage/leakage?*
- 4) *Comment on integrity of storage facilities?*
- 5) *Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?*
- 6) *Are spill kits apparent?*
- 7) *Any substations and is the date of installation known. Pre 1986 may contain PCB.*
- 8) *Any other raw material storage areas, treatment or process areas?*

SITE OPERATION (PAST AND PRESENT)

- 1) *Describe specific process lines and operations on site?*
- 2) *Are there any established/accredited process, environmental management, waste management systems/protocols in place?*
- 3) *Are there any residual indicators of a sites past use e.g. old fences/gates, floor slabs, old tanks?*
- 4) *Any evidence of the site ever being involved in military activities.*
- 5) *Any discharge consents/abstraction licenses?*
- 6) *Any process controls e.g. LAPPC, IPPC*

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION	
N/A	
1)	<i>State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials</i>
2)	<i>Consider old buildings and relic storage/process areas.</i>

SURROUNDING LAND USE	
NORTH	A47 (Fort Parkway) with Jaguar Land Rover Assembly Plant immediately beyond.
NORTHEAST	
EAST	B&Q outlet with residential properties beyond.
SOUTH EAST	
SOUTH	River/brook (overflow channel?)/Railway/M6 (and open land in between) with residential properties beyond.
SOUTHWEST	
WEST	Jaguar Land Rover Holding Facility.
NORTHWEST	
GENERAL	
1) <i>Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination.</i> 2) <i>Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)</i>	

MISCELLANEOUS COMMENTS/NOTES

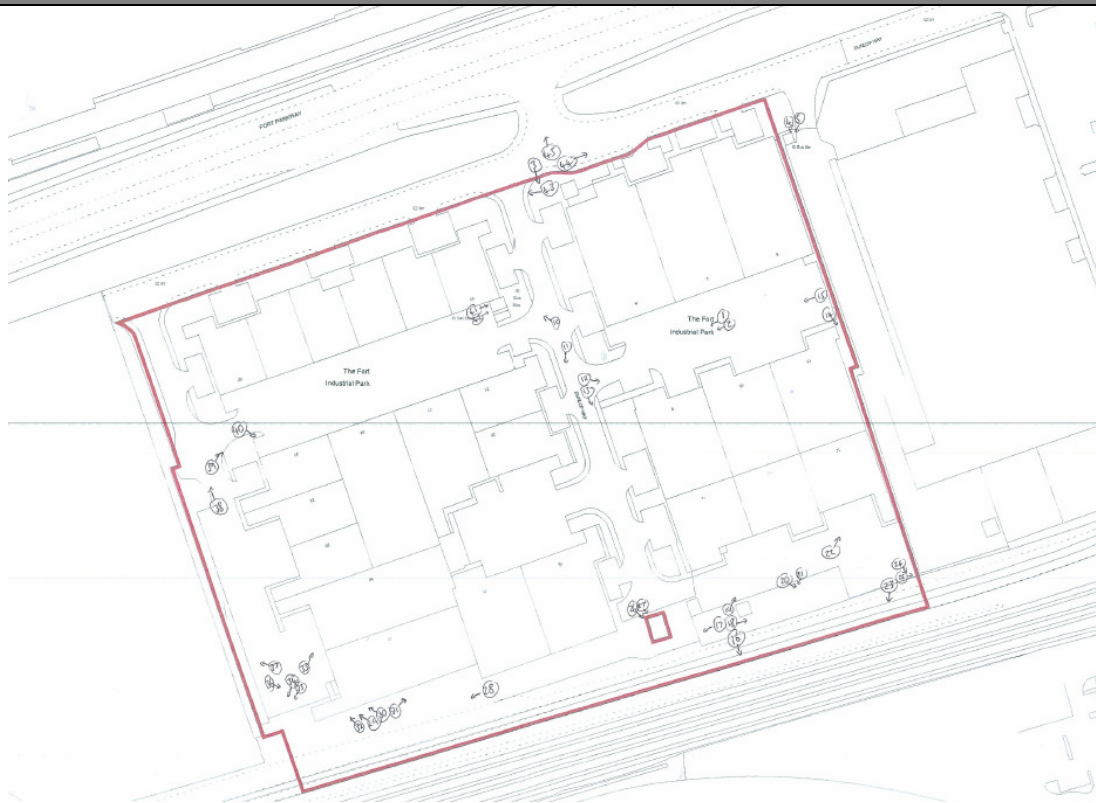


Photo Plan



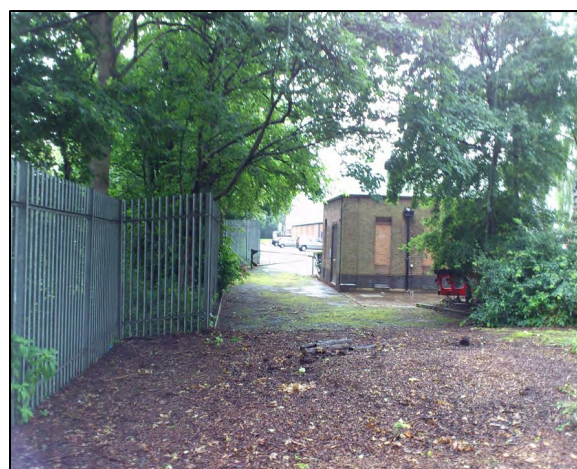
Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8



Photograph 9



Photograph 10



Photograph 11



Photograph 12

GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	Jaguar Land Rover Holding Facility, Castle Bromwich, Castle Vale, Birmingham, B35 7RA
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PROJECT REFERENCE:	47062728	DATE:	06/07/2012
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PREPARED BY:	Land quality project team	NGR:	
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WEATHER:	Moderate/heavy rain; overcast; 8/8 cloud cover.
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OVERVIEW SITE DESCRIPTION
<p>Site is occupied by an operational car holding facility for vehicles produced by Jaguar Land Rover. The site is approximately 250 m by 185 m in size and rectangular in shape (although the site area includes part of Dunlop Way extending to the north east). The southern, western and eastern boundaries are represented by a steel fence approximately 3 m in height, whilst a brick wall approximately 3 m in height forms the northern boundary. The site is located approximately 50 – 60 m north of the proposed HS2 alignment. A site layout plan for reference in conjunction with this proforma can be found attached.</p>
1) Provide an generalised description of the site and main activity

TOPOGRAPHY
<p>Relatively level, although drops approximately 0.5 m – 1.0 m elevation from the centre of the site to the north, whilst slight depression in centre of the site to accommodate surface water drainage.</p> <p>Approximately 95% hardstanding/building cover (mainly hardstanding) and 5% unprotected ground with the latter generally represented by localised areas of landscaping/planting and vegetation cover mainly around the perimeter of the site. The car park is comprised of good quality tarmac whilst a rail link accessed from the south of the site is comprised in part of very good quality tarmac which appears very recent in age.</p> <p>No evidence of exposed Made Ground in cut or fly tipping, although area of discarded chairs/boxes/plastic at the rear of the offices near the entrance in the north west corner.</p>
1) Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.
2) Look for evidence of Made Ground
3) Look for evidence of fly tipping
4) Gradient
5) Estimate percentage vegetation cover

SOIL QUALITY

Where exposed, topsoil appears clean brown slightly sandy slightly gravelly clay. Occasional litter (e.g. plastic bag, paper, bubble wrap).

If exposed/present describe soil distribution and key characteristics including:

- 1) *the presence of any odours;*
- 2) *coloured or oily deposits on the soil surface;*
- 3) *litter build up on soil surface;*
- 4) *absence of worm casts unless soil is naturally acidic;*
- 5) *soil structure etc.*

SITE DRAINAGE

Numerous surface water drains around the site (look well maintained and of good integrity). However moderate/heavy rain on the day of the survey highlighted several areas site-wide prone to localised surface water ponding in ground level depressions.

- 1) *Describe observations of any standing water or poor drainage*
- 2) *Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity*

WATER QUALITY

No signs of contamination noted.

- 1) *Assess the quality of any standing or running water either on site, or running to from the site.*
- 2) *In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.*

VEGETATION COVER

Vegetation cover is generally represented by areas of landscaping/planting around the perimeter of the site. It was noted to be generally in a healthy, albeit overgrown, condition, comprising of a mixture of semi-mature/mature bushes and trees (particularly at the southern boundary), grass, nettles and weeds.

- 1) *Describe distribution and note presence and absence across the site.*
- 2) *Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity*
- 3) *Mature trees indicate site may have been undisturbed for some time.*
- 4) *Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?*
- 5) *Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:*
 - a) *Look for visible signs of plant distress or discolouration, poor root and nodule development.*
 - b) *Do trees appear stunted or diseased?*
 - c) *Are there areas of poorly vegetated or bare patches of ground?*
 - d) *Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?*
 - e) *Are there any indicator species e.g. metal tolerant species?*

ECOLOGICAL ISSUES (OUTLINE)

Giant Hogweed and Japanese Knotweed noted off-site adjacent south around the rail link access road fences.

- 1) *Not intended to replace a formal ecological assessment but to highlight any standout potential constraints*
- 2) *Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.*
- 3) *Is there any evidence of fauna e.g. burrows, droppings, animal prints?*
- 4) *Evidence of bat roost potential e.g. open roof spaces*
- 5) *Presence of knotweed or invasive species?*

BUILDINGS AND LARGE INFRASTRUCTURE

Main offices/security buildings are semi-permanent portacabins, all present near the entrance in the west of the site.

- 1) *Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.*
- 2) *Only enter a building if safe to do so.*
- 3) *Consider the potential for the building to be listed or to have historic value*
- 4) *Note any evidence or indicators that contamination may have taken place*

ANCILLIARY INFRASTRUCTURE

Floodlights/fire extinguisher points generally around the perimeter. Electricity sub-station at the entrance in the west (brick surround).

- 1) *Are there any above or below ground bulk fuel or chemical storage tanks?*
- 2) *Are there any above or below ground pipe work used to convey chemicals or fuels?*
- 3) *Any evidence of spillage/leakage?*
- 4) *Comment on integrity of storage facilities?*
- 5) *Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?*
- 6) *Are spill kits apparent?*
- 7) *Any substations and is the date of installation known. Pre 1986 may contain PCB.*
- 8) *Any other raw material storage areas, treatment or process areas?*

SITE OPERATION (PAST AND PRESENT)

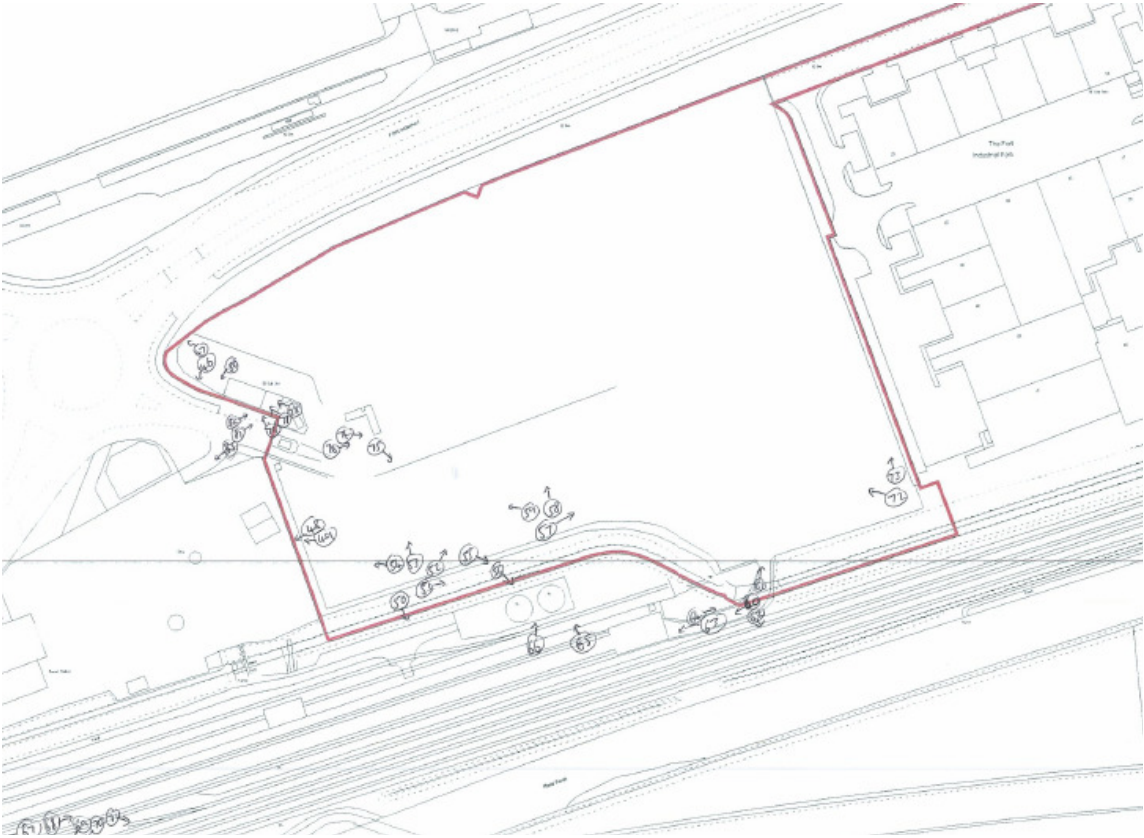
- 1) *Describe specific process lines and operations on site?*
- 2) *Are there any established/accredited process, environmental management, waste management systems/protocols in place?*
- 3) *Are there any residual indicators of a site's past use e.g. old fences/gates, floor slabs, old tanks?*
- 4) *Any evidence of the site ever being involved in military activities.*
- 5) *Any discharge consents/abstraction licenses?*
- 6) *Any process controls e.g. LAPPC, IPPC*

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION

N/A

- 1) *State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials*
- 2) *Consider old buildings and relic storage/process areas.*

SURROUNDING LAND USE	
NORTH	A47 (Fort Parkway) with Jaguar Land Rover Assembly Plant immediately beyond.
NORTHEAST	
EAST	Fort Industrial Park with residential properties beyond.
SOUTH EAST	
SOUTH	Brick-lined river/brook and railway/sidings/good shed/M6 (and open land in between) with residential properties beyond. Also two large gas holders (?) adjacent to southern boundary (strong ambient smell of gas on the breeze in this area).
SOUTHWEST	
WEST	Fort Dunlop Power Plant (Rolls Royce Industrial Power Systems) with further industrial land use beyond.
NORTHWEST	
GENERAL	
1) Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination. 2) Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)	

MISCELLANEOUS COMMENTS/NOTES
<p>Security guard tells that the area of land in between the holding facility and rail link (housing the gas holders(?)) is owned by Fort Dunlop Power Plant (Rolls Royce Industrial Power Systems).</p>  <p>Photo Plan</p>



Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8



Photograph 9



Photograph 10



Photograph 11



Photograph 12

GEO-ENVIRONMENTAL SITE INSPECTION PRO FORMA

PROJECT:	HS2 West Midlands Contract 254
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SITE ADDRESS:	Dunlop Tyres, Wood Lane, B24 9FD
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PROJECT REFERENCE:	47062728	DATE:	21/08/2012
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PREPARED BY:	Land quality project team	NGR:	-
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WEATHER:	Overcast; dry; cool; slight breeze.
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OVERVIEW SITE DESCRIPTION
Tyre manufacturing and repair (see map for more detail).
1) Provide an generalised description of the site and main activity

TOPOGRAPHY
Level.
Approximately 90% hard standing cover (external = average-good quality tarmac some potholes, internal = concrete) and 10% unprotected ground (soft landscaping)
1) Estimate percentage hard cover/buildings to unprotected ground and include comment on the quality/condition of cover.
2) Look for evidence of Made Ground
3) Look for evidence of fly tipping
4) Gradient
5) Estimate percentage vegetation cover

SOIL QUALITY
Where exposed, appears to be clean brown slightly gravelly sandy clay/topsoil (occasional spongy organic material and sand). Frequent litter noted e.g. plastic cups, paper and plastic bottles.
If exposed/present describe soil distribution and key characteristics including: 1) the presence of any odours; 2) coloured or oily deposits on the soil surface; 3) litter build up on soil surface; 4) absence of worm casts unless soil is naturally acidic; 5) soil structure etc.

SITE DRAINAGE

Surface water drainage network noted. No evidence of significant ponding. Some accumulations in potholes and on gravel car park at end of offices.

- 1) *Describe observations of any standing water or poor drainage*
- 2) *Note any drainage system or presence of interceptors/catchment drains particularly in areas of bulk fuel/chemical storage and use on industrial sites. Comment on condition/integrity*

WATER QUALITY

Where standing water noted it was silty with no obvious sheen.

- 1) *Assess the quality of any standing or running water either on site, or running to from the site.*
- 2) *In particular look for turbidity of the water, discolouration, odours, foaming, presence of sewage fungus, presence of oily sheen or oil deposits, gas bubbles, lack of fauna or vegetation.*

VEGETATION COVER

Generally healthy in appearance, Semi-mature to mature bushes and trees confined to areas of the boundary (see map) and landscaped bunds. Grassed landscaping near entrance. Burrow noted in hedgerow.

- 1) *Describe distribution and note presence and absence across the site.*
- 2) *Comment on type e.g. shrub, grass, young, semi-mature and mature trees, hedgerow, marsh etc. and diversity*
- 3) *Mature trees indicate site may have been undisturbed for some time.*
- 4) *Do young trees and saplings appear to have regenerated naturally – indicative of good soil and drainage?*
- 5) *Any evidence of vegetation stress or is an otherwise uniform distribution interrupted? Pay particular attention to:*
 - a) *Look for visible signs of plant distress or discolouration, poor root and nodule development.*
 - b) *Do trees appear stunted or diseased?*
 - c) *Are there areas of poorly vegetated or bare patches of ground?*
 - d) *Are there any uncharacteristic plant assemblages for location, climate, soil type and period of colonisation?*
 - e) *Are there any indicator species e.g. metal tolerant species?*

ECOLOGICAL ISSUES (OUTLINE)

Nesting peregrine in Fort Dunlop building adjacent. Frequent pigeons and seagulls. Rabbits noted.

Japanese Rose noted in far west corner but technically offsite.

- 1) *Not intended to replace a formal ecological assessment but to highlight any standout potential constraints*
- 2) *Look for surface water features and potential aquatic habitats on site and in the immediate surrounds.*
- 3) *Is there any evidence of fauna e.g. burrows, droppings, animal prints?*
- 4) *Evidence of bat roost potential e.g. open roof spaces*
- 5) *Presence of knotweed or invasive species?*

BUILDINGS AND LARGE INFRASTRUCTURE

Main factory, one storey brick and concrete construction (approx. 95 yrs old), possible asbestos roof. North light roofing Offices which appear more recent. Brick built 3 storey- flat roof and slight pitched roof. Asbestos possibly in roofing.

Water tank noted (see map) – on a concrete footing approximately 0.50 m above the ground surface. Approximately 9 – 10 m in height. Petroleum distillates vats and adhesives/sealants located outside of water tank, as well as paints/oil water, lubes and IBCs (content uncertain) and fluorescent lights (spent?)

Chemical store noted (see map) – assumed on a concrete footing. Single storey, brick built structure with a flat roof.

Fire pump house noted (see map) – on a concrete footing. Single storey, brick built structure with a flat roof.

Security building – single storey, brick built structure with a slightly pitched roof.

Gas meter building – single storey brick built structure, approximately 5 m by 3 m in size, with a flat roof.

Liquid Nitrogen tank.

Naptha store (in main building) – creates explosive atmosphere.

- 1) *Consider the number and distribution of buildings, construction type, presence of asbestos (visual only), number of storeys, stability, note headroom and access in terms of any ground investigation techniques that might be employed.*
- 2) *Only enter a building if safe to do so.*
- 3) *Consider the potential for the building to be listed or to have historic value*
- 4) *Note any evidence or indicators that contamination may have taken place*

ANCILLIARY INFRASTRUCTURE

Numerous tanks (including water tank, liquid nitrogen, floodlights (free standing in car park and on building). Numerous surface water drains noted, manholes and trench scars. Handrails and stairs associated with buildings.

Naptha store in main building

Substation in NW of building

Gas vent at northern boundary (adjacent offsite).

Some staining noted on car park surface otherwise no evidence of spillage

Storage facility integrity noted to be good.

Spill kits not obvious.

- 1) *Are there any above or below ground bulk fuel or chemical storage tanks?*
- 2) *Are there any above or below ground pipe work used to convey chemicals or fuels?*
- 3) *Any evidence of spillage/leakage?*
- 4) *Comment on integrity of storage facilities?*
- 5) *Are containment measures in place e.g. bunds and are they in good condition and sufficient in size to contain the volume stored in the tanks in the event of an incident?*
- 6) *Are spill kits apparent?*
- 7) *Any substations and is the date of installation known. Pre 1986 may contain PCB.*
- 8) *Any other raw material storage areas, treatment or process areas?*

SITE OPERATION (PAST AND PRESENT)

Tyre repair and manufacture. Concrete slab on northern boundary.

- 1) Describe specific process lines and operations on site?
- 2) Are there any established/accredited process, environmental management, waste management systems/protocols in place?
- 3) Are there any residual indicators of a sites past use e.g. old fences/gates , floor slabs, old tanks?
- 4) Any evidence of the site ever being involved in military activities.
- 5) Any discharge consents/abstraction licenses?
- 6) Any process controls e.g. LAPP, IPPC

VISUAL OR ANECDOTAL EVIDENCE OF CONTAMINATION

Nothing noted with the exception of previous GI findings (see map notes).

- 1) State nature and type e.g. staining, oil sheen, free product, soil discolouration, oil drums, leaks/spills, discarded drums that may contain residual materials
- 2) Consider old buildings and relic storage/process areas.

SURROUNDING LAND USE

NORTH	Vacant Prologis Building, warehouse, Stadco car parts
NORTHEAST	
EAST	Fort Dunlop Building
SOUTH EAST	
SOUTH	Road with railway beyond
SOUTHWEST	
WEST	Industry and Fort Shopping Centre beyond
NORTHWEST	
GENERAL	Similar topography
1)	Identify both sensitive receptors, e.g. residential, nature reserves, schools, SSSI as well as potential off site sources of contamination.
2)	Consider whether the subject site appears markedly different to its surroundings in terms of topography, drainage, vegetation and soil type (if apparent)

Page 5

Updated July 2013

Geo-environmental Site Inspection Pro Forma

Page 5

Updated July 2013

Geo-environmental Site Inspection Pro Forma



Updated July 2013

Geo-environmental Site Inspection Pro Forma



Photograph 1



Photograph 2



Photograph 3



Photograph 4



Photograph 5



Photograph 6



Photograph 7



Photograph 8



Photograph 9



Photograph 10



Photograph 11



Photograph 12